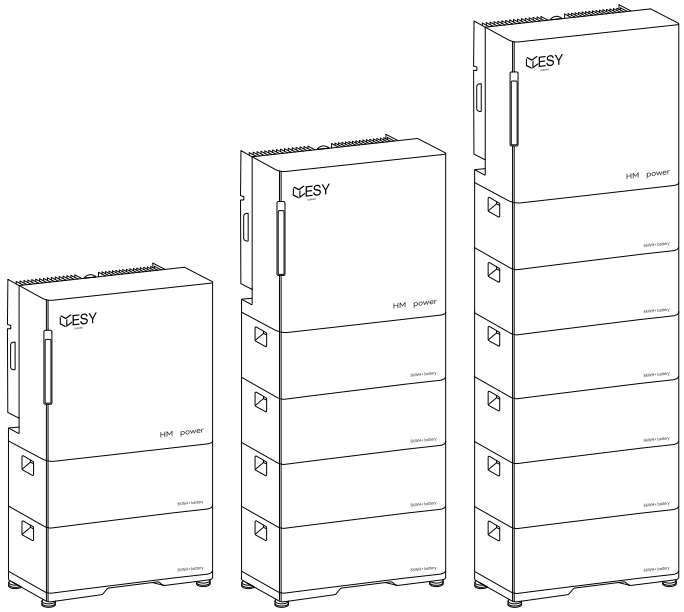
HM Series Residential Energy Storage System User Manual

(V-C03)



ESY Sunhome Co., Ltd
Website: www.esysunhome.com
TEL: +86 (0)755 8522 9087
Email: info@esysunhome.com
ADD. : Building 6, No. 5-2, inner ring road, Shanxia community, Pinghu street, Longgang District, Shenzhen GD, China 518000

Made in China

CE RoHS

ESY Sunhome Co., Ltd

Company Overview

With over two decades of experience, ESY SUNHOME 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, ESY SUNHOME is renowned for its innovative solutions. Supported by advanced 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, ESY SUNHOME 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.

Table of Contents

Table of Contents

1 Precautions

1.1 General Statement

Statement

This manual applies to the HM Series residential energy storage system. Please read this manual carefully and strictly adhere to all safety instructions during installation, operation, and maintenance. ESY SUNHOME will not be liable for any consequences arising from noncompliance with the general safety requirements or safety standards of design, production and use.

It is crucial to use this product under the specified design conditions, as any damage to parts, personal injury, or property loss resulting from improper usage will not be covered by the warranty. In addition, during installation, usage, and maintenance, all local laws and regulations must be observed. The safety instructions in this manual are supplementary to local laws and regulations.

ESY SUNHOME reserves the right not to assume any responsibility for consequences arising from the following:

- Expiation of free warranty of the product and its parts;
- Damage caused during transportation;
- Noncompliance with the installation, modification or use of national standards;
- Noncompliance with the installation and use instructions outlined in this manual;
- Operation under harsh conditions that are not specified in this manual;
- Failure or damage caused by installation, repair, modification, or disassembly by non-authorized service personnel;
- Energy storage system failure or damage caused by the use of non-standard components or software or those that are not provided by our company;
- Noncompliance with relevant international standards for design, installation and use;
- Equipment damage caused by abnormal natural conditions (force majeure such as lightning strikes earthquakes, fire and storms).

1.2 Requirements for Installation and Maintenance Personnel

- The personnel to be dispatched for installing or maintaining ESY SUNHOME 's equipment are fully trained and knowledgeable of all safety precautions and capable of performing all operations correctly.
- Equipment installation, operation and maintenance must be carried out by professionals or trained personnel.
- Safety facilities must be dismantled and inspected by professionals.
- System or components (including software) may be replaced by professionals or authorized personnel.

NOTE

Professionals: refer to the personnel who have received training or are experienced in system operation and have professional knowledge about the sources and extents of potential hazards during device installation, operation, and maintenance.

Trained personnel: refer to the personnel who have received technical training or have the necessary experience, and are aware of possible hazards in some operations and able to take protective measures to minimize hazards to themselves and others.

Operators: refer to the personnel who have access to system except trained personnel and professionals.

1.3 Important Safety Information

- Before installation, operation and maintenance, please read this manual carefully.
- Make sure that the product is effectively grounded before operation. The grounding resistance should be less than 0.1Ω.
- Install all terminals of the energy storage system in accordance with the instructions in this manual.
- Follow the corresponding signs and symbols on equipment during operation.
- The battery terminal may be live during operation. If the battery is not connected, please apply pearl wool inside the protective cover as a protective measure.
- The grid-connected electricity selling of the energy storage system must be approved by the local power department, or compliant with the relevant provisions of national and local laws and regulations. It must be done by qualified personnel.
- Use a dry powder extinguisher in case of fire. Do not use a liquid extinguisher.

Danger signs

	**Danger!** Unauthorized removal of necessary protection, improper use, incorrect installation, or incorrect operation may result in serious personal injury or equipment damage. Transportation, installation, startup, disassembly, and maintenance must be carried out by qualified or trained personnel.
	**Danger!** Prior to attempting any repair, electrical installation, or accessing any live parts, make sure that the inverter is cut off and wait for 5 min until internal capacitors are discharged to a safe voltage.
	**Danger!** Do not connect the N wire of the load to that of the power grid, or connect the power grid cable to the output end of the load. Doing so may result in serious damage to the product and load.
	**Danger!** The external CT must be connected to the inverter properly and securely before use. Failure to do so may result in high voltage at the CT ports.

Warning signs

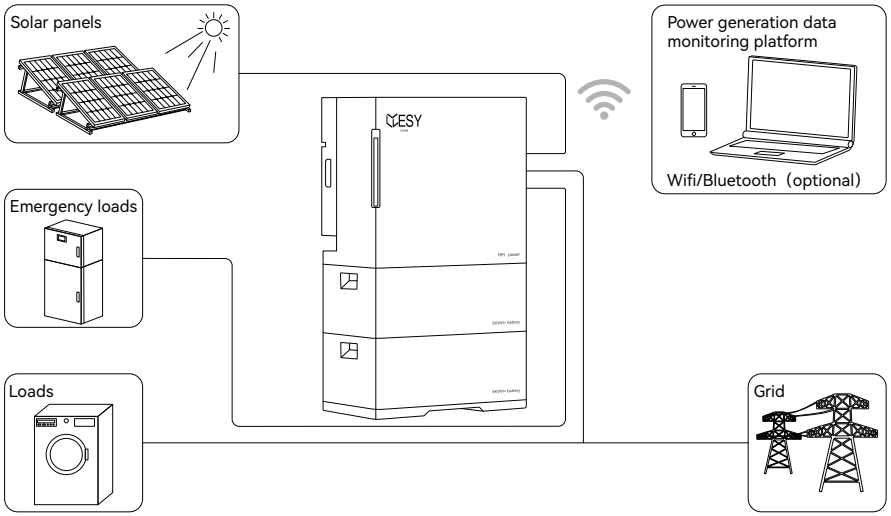
	**Warning!** Installation must fully comply with national and local laws and regulations.
	**Warning!** Since the non-isolated topology is applied on the PV and grid side of the inverter, please use monocrystalline silicon or polysilicon battery panels (the negative PV must not be grounded).
	**Warning!** 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 it is connected.

	**Warning!** Make sure that the input voltage of the power's PV port 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; and the voltage of the PV module is about 15% higher in winter at -20℃ compared to summer at 30℃]. Do not connect any energy source other than the PV module at the PV input port.
	**Warning!** Do not change the internal circuit of the inverter without permission.
	**Warning!** Prior to power grid connection, the product must be securely grounded. Please follow the instructions in this manual. Improper operation may cause serious losses.
	**Warning!** Please install a lightning protection equipment in the power distribution box.
	**Warning!** The system is not suitable as the primary or backup power supply for life support systems or medical equipment, as it cannot guarantee power in all situations.

2 Product Introduction

2.1 Overview

The ESYSUNHOME HM Series residential energy storage system is a solar storage charging system. It integrates inverter, battery, and the Internet, and can connect to the grid, photovoltaic panels, and the Internet of Things to provide electricity for homes, small supermarkets, farms, and other places.



2.1.1 Structural Features

- The vertical all-in-one structure can be installed quickly without complex wiring.
- The battery capacity ranges from 5 KWH to 30 KWH. The number of stacked batteries can be increased or decreased quickly and easily to meet the power demands of different scenarios, providing quick and easy adaptability.
- The design of the system seamlessly combines both security and aesthetics, featuring a simple and stylish look with a linear light bar and no visible buttons. Additionally, the system is waterproof with an IP66 rating, enhancing safety and increasing its overall lifespan.
- The system uses natural heat dissipation to reduce the noise from air cooling. The noise measured at 1m is not greater than 25dB in the non-alarm mode.

2.1.2 Functional Features

- This product has a variety of working modes (e.g. normal mode, emergency mode and electricity selling mode) to meet the needs of different scenarios.
- The detailed energy management solution is conducive to more economical and efficient use of solar energy.
- When used with PV panels, this product utilizes solar energy to generate power, which can then be stored and used for household needs.
- Support grid-connected and off-grid modes. This product can be used as a backup emergency power supply, which can be immediately turned on in case of power outages.
- The working mode of the energy storage system can be changed by Cloud depending on the power grid, load, electricity price and weather to ensure a stable power supply.
- PV power generation, energy storage in batteries，and peak–to-valley regulation of electricity consumption can reduce electricity costs and add value.
- The ESYSUNHOME APP allows for real-time monitoring of power generation and consumption, as well as the setting of operating modes, enabling users to monitor and control the system's operation.

2.2 Product Parameters

2.2.1 Parameter of Inverter

Model	ESYSUNHOME HM5	ESYSUNHOME HM6
Rated power	5000 W	6000 W
Operating mode	Monitoring software	
PV input		
Max. input power	8000 W	
Max. input voltage	550 Vd.c.	
Rated input voltage	360 Vd.c.	
Starting voltage	150 Vd.c.	
Min. operating voltage	100 Vd.c.	
MPPT operating voltage range	100 Vd.c.~540 Vd.c.	
Max. input current	15 Ad.c.+15 Ad.c.	
Max. short-circuit current	20 Ad.c.+20 Ad.c.	
Number of MPPTs	2	
PV input operating voltage range	100~540 Vd.c.	
PV input backfeed short circuit current	0 Ad.c.	
Grid		
Number of phases	Single-phase (L+N+PE)	
Rated input/output power	5000 W/5000 W	6000 W/6000 W
Max. input/output apparent power	5000 VA/5000 VA	6000 VA/6000 VA
Rated output apparent power	5000 VA	6000 VA
Rated input/output voltage	230 Va.c.	
Voltage range	184 Va.c.~276 Va.c. ±2%	
Rated frequency	50 Hz	
Rated input/output current	21.74 Aa.c./21.74 Aa.c. @230 V	26.09 Aa.c./26.09 Aa.c. @230 V
Power factor	0.8 (leading)~0.8 (lagging)	
THDI (rated power)	≤3%	

Model	ESYSUNHOME HM5	ESYSUNHOME HM6
Grid		
Rated frequency	50 Hz	
Rated input/output current	21.74 Aa.c./21.74 Aa.c. @230 V	26.09 Aa.c./26.09 Aa.c. @230 V
Power factor	0.8 (leading)~0.8 (lagging)	
THDI (rated power)	≤3%	
Load		
Rated power	5000 W	6000 W
Max. output apparent power	5000 VA	6000 VA
Rated voltage	230 Va.c.	
Rated current	21.74 Aa.c @ 230 V	26.09 Aa.c @ 230 V
Output voltage range	184 Va.c.~276 Va.c. ±2%	
Output frequency	50 Hz ±1%	
THDV	≤ 3%(linear load)	
Overload capacity	105%, 60 s/120%, 30 s	
Switching time	≤ 20 ms	
Compatible battery specification		
Battery type	LiFePO4	
Grid charging	Yes	
Rated voltage	51.2 Vd.c.	
Voltage range	40.8 Vd.c.~ 57.6 Vd.c.	
Charging current	Maximum 100 Ad.c.	
Max. charging voltage	58 Vd.c.	
Max. discharge current	120 Ad.c.	
Rated current (Max. continuous) input and output	100 Ad.c./120 Ad.c.	
Efficiency		
Maximum efficiency	97.80%	
MPPT efficiency	99.90%	
Others		
Topology	Non isolated	
Protection Rating	IP 66	
Dimensions (L*W*H)	600±0.8 mm*305±0.5 mm*530±0.8 mm	
Net weight	36.4±0.5 kg	
Gross weight	42.1±0.5 kg	
Installation	Installation on ground	
Operating temperature	Installation on ground-25~60 ℃ (derating above 45 ℃)	
Storage temperature	-25~70 ℃	
Cooling mode	Natural cooling	
Altitude	≤4000 m	
Relative humidity	0~100%	
Noise level at 1m	≤25 dB	
Environmental category	Outdoor	
Environment pollution degree	External: PD 3, Internal: PD 2	
Communication mode	WiFi/GPRS (optional), USB/RS485	
Current (inrush)	8 Aa.c.	
Rated apparent power	5000 VA	6000 VA
Max. output fault current	36.96 Aa.c. (21.74 Aa.c.*1.7)	44.35 Aa.c. (26.09 Aa.c.*1.7)
Max. output overcurrent protection	105 A	
Grid Mains output short circuit current	157 A/ 1.8 ms	
Load output short circuit current	171 A/ 108 ms	
Battery output short circuit current	726 A/ 4.65 ms	
AC input backfeed short circuit current	0 Aa.c.	

Model	ESYSUNHOME HM5	ESYSUNHOME HM6
Others		
Battery input backfeed short circuit current	0 Aa.c.	
Anti-islanding method	Active anti-islanding: Power Variation (method c)	
Protective class (I, II or III)	I	
Over voltage category	OVC II (for DC); OVC III (for AC)	
Protection	Over/under-voltage, over /under-frequency, overload, short circuit, over-temperature, reverse polarity of PV module and battery, leakage current, insulation resistance, anti-island protection.	
Standards	IEC 62109-1/-2	
EMC Standards	IEC 61000-6-1, IEC 61000-6-3	
Grid-connected standards	AS 4777.2	
Warranty	120 months	
Country of Manufacture	China	

2.2.2 Parameters of 5KWH+ Residential Energy Storage Battery

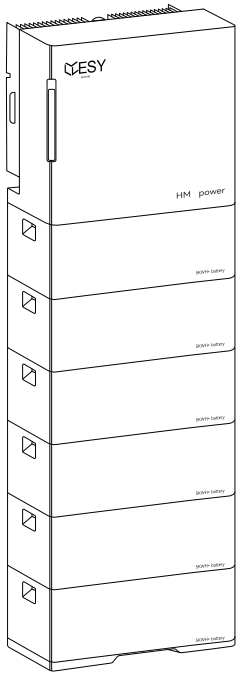
Model	
Rated voltage	51.2 Vd.c.
Voltage range	40.8Vd.c.~57.6Vd.c.
Max. charge current	95 Ad.c.
Max. discharge current	95 Ad.c.
Rated capacity	100 Ah
Rated energy	5.12 kWh
Operating temperature	-20~58℃
Battery type	LiFePO4
Battery designation	IFpP48/125/173[1P16S]M/-20+40/95
Protection rating	IP66
Protection class	I
Standard temperature range for charging	3 ℃~55 ℃
Standard temperature range for discharging	-20 ℃~58 ℃
Size(LxWxH)	600 mmx305 mmx220 mm
Gross weight	52.1 kg
Net weight	49.55 kg

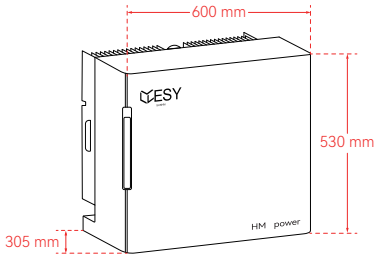
2.2.2 Module Models

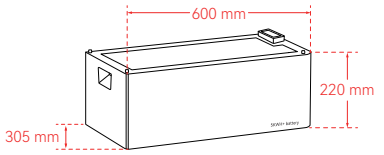
Module Model	HM5/6-05	HM5/6-10	HM5/6-15
Quantity of batteries	1	2	3
Maximum output power	5	6	6
Battery capacity (kWh)	5.12	10.24	15.36
Size (LxWxH) (mm)	600x305x778	600x305x998	600x305x1218
Weight (kg)	93	143	193
Module Model	HM5/6-20	HM5/6-25	HM5/6-30
Quantity of batteries	4	5	6
Maximum output power	6	6	5
Battery capacity (kWh)	20.48	25.6	30.72
Size (LxWxH) (mm)	600x305x1438	600x305x1658	600x305x1878
Weight (kg)	243	293	343

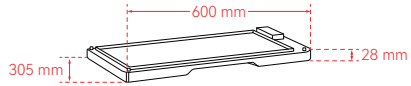
2.3 Dimensions

2.3.1 Outline Dimensions

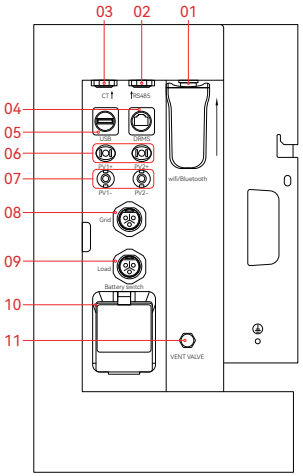








2.3.2 Port Descriptions

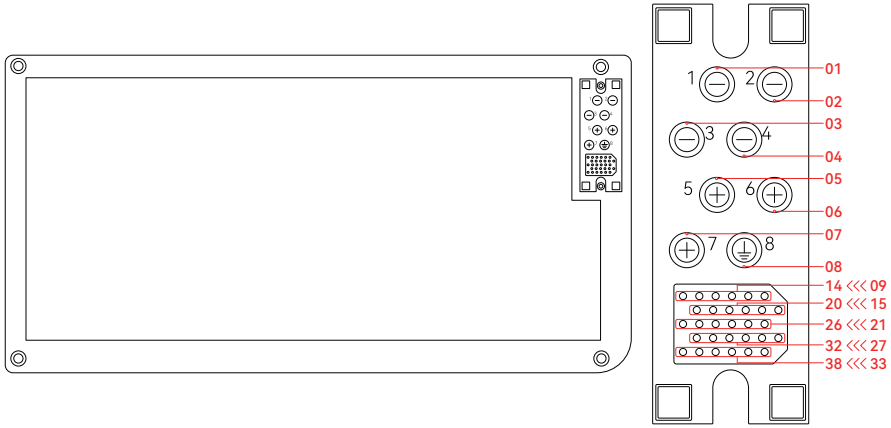


Lateral marks on the inverter

Description of each lateral mark on the Inverter

S/N	Mark	Description
01	WiFi-IOT Pro port	Optional
02	RS485 port	Upper computer connection to control the product
03	CT port	Connection of external CT or electricity meter signal
04	DRM port	DRM port
05	USB port	USB upgrade interface
06	Positive PV port	Positive PV terminal connection
07	Negative PV port	Negative PV terminal connection
08	Grid port	Grid connection
09	Load port	Load connection
10	Battery Switch	Battery switch
11	VENT VALVE	Pressure relief valve

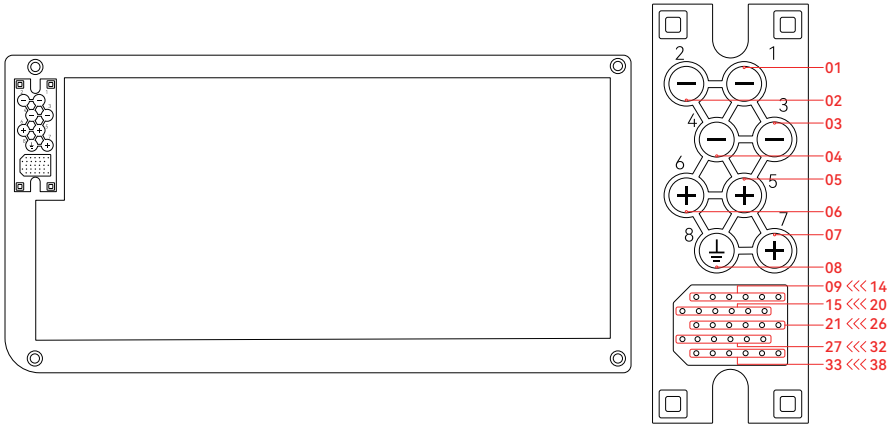
Schematic diagram of top port arrangement for
5KWH+ Residential energy storage battery



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

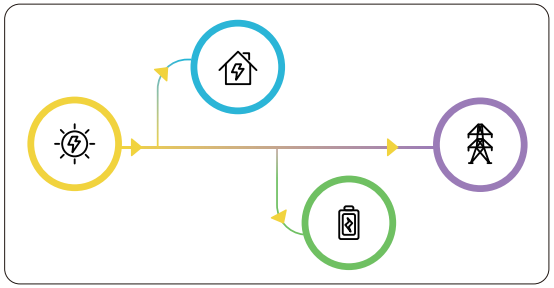
2.3.3 Nameplate Identification

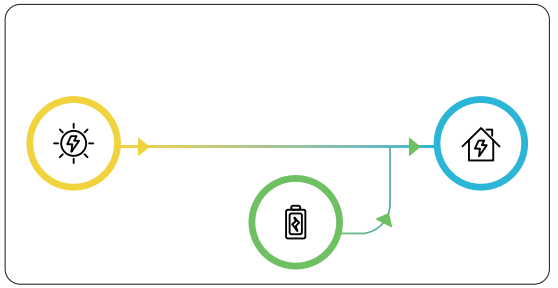
MODEL: ESYSUNHOME HM	ESYSUNHOME HM Series: model, indicating that the inverter specification is 5 kW.
ESYSUNHOME 5KWH+	ESYSUNHOME 5KWH+: model, indicating that the battery specification is 5 kWh.
	Pay attention to safety.
	Pay attention to high surface temperature.
	Be cautious of electric shock.
	Prior to attempting any repair, electrical installation or accessing any live parts, make sure that the inverter is cut off and wait for 5 min until internal capacitors are discharged to a safe voltage.
	Professional recycling is required.
	Please read this manual before using the product.
	Compliant with CE safety certification standards.

2.4 Working Modes

2.4.1 Regular Mode

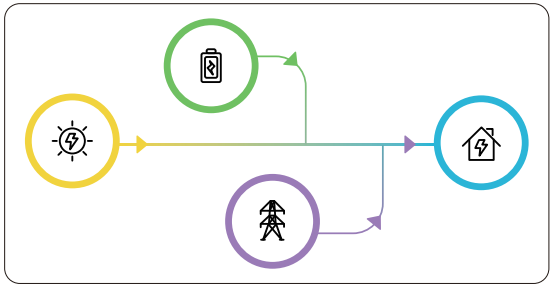
When there is sufficient PV energy, priority is given to supplying backup loads and household loads, followed by charging the battery. Any excess energy is then sold to the power grid.



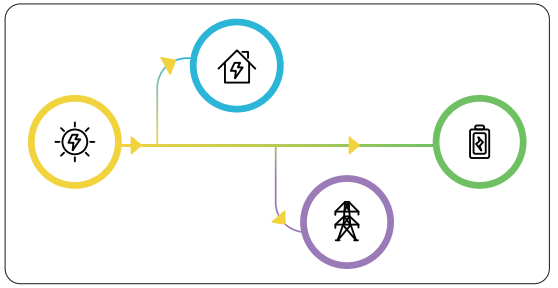


When the PV energy is insufficient to meet the load demands, the power stored in the battery will be used as a priority.

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

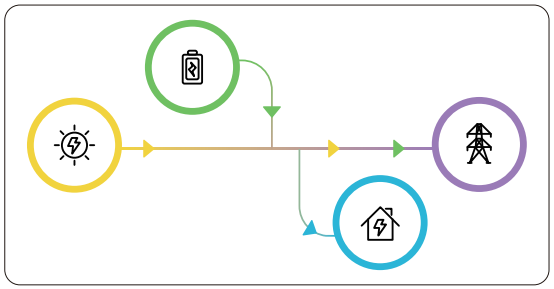


2.4.2 Electricity Sale Mode

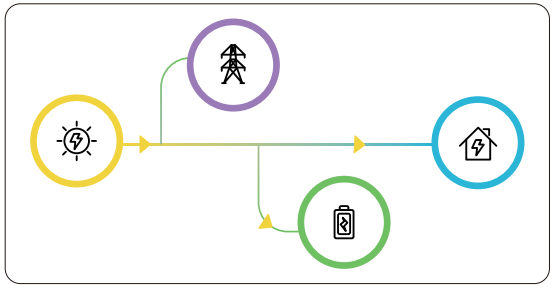


Loads are given priority for power supply and any excess electricity is sold to the power grid at maximum output.

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

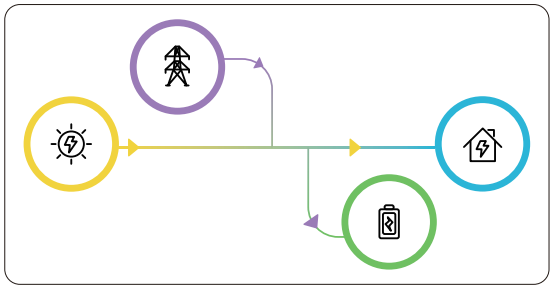


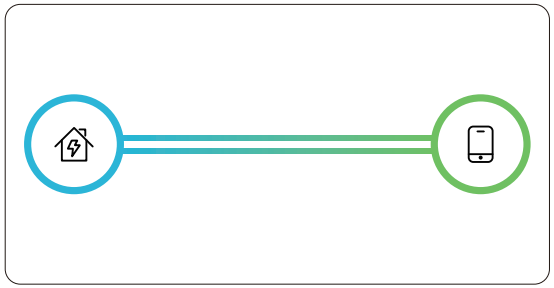
2.4.3 Emergency Mode



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.





2.4.4 Battery Energy Management

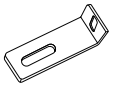
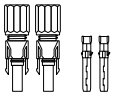
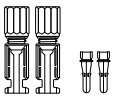
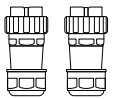
Battery Energy Management This mode allows users to set time periods for charging, discharging, or exporting power based on their needs, helping to optimize energy usage and reduce costs.

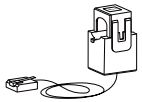
3 System Installation

3.1 Packing List

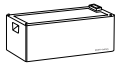
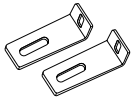
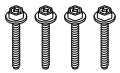
3.1.1 Packing List of Inverter

Before installation, please carefully check the product and its accessories against the packing list.

Name	Specifications	Quantity	Schematic Diagram
Inverter	HM Series inverter	1	
Expansion tubes with screws	M6x40 mm	1	
Expansion screw gasket	Inner diameter: 5 mm, outer diameter: 12 mm, SUS304 gasket	1	
Angle iron	L79.5x32x25 mm	1	
Angle iron screws	Cross recessed outer hexagonal double-gasket screw, M4x12mm	1	
PV+ connector	VP-D4B-CHSM4 external terminal casing, including metal terminal	2	
PV- connector	VP-D4B-CHSF4 internal terminal casing, including metal terminal	2	
Ground wire screw	Cross recessed outer hexagonal double-gasket screw, M6x12 mm	1	
Ring-shaped crimp cable lug	RNB5.5-6,48 A, Φ=6.5 mm, 5.6×23 mm	1	
AC output terminal	3-pin waterproof connector	2	
LAN port connector	Waterproof protection plug of LAN port communication cable (meter communication cable *1, spare *1)	2	

Name	Specifications	Quantity	Schematic Diagram
Key		1	
Manual	HM Series, English(V-C03)	1	
WiFi-IOT Pro	LSW-5A7153,5-12Vdc	1	
CT	CTF16T-1k-50 50A-50mA	1	

3.1.2 Packing List of 5KWH+ Residential Energy Storage Battery

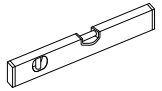
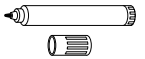
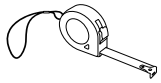
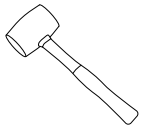
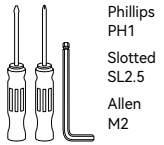
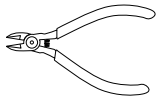
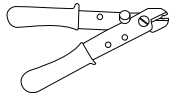
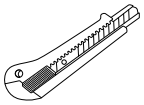
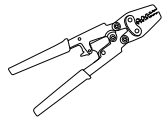
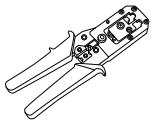
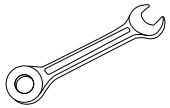
Name	Specifications	Quantity	Schematic Diagram
Battery	5KWH+ residential energy storage battery	1	
Fixing angle iron screws	M4x8 mm	2	
Waterproof Gasket	Silicone, black, matte, 110x39.9x9 mm	1	
Angle irons	L79.5x32x25 mm	2	
Handlebar screws	M4x30 mm flange hex screws	4	
Expansion tubes with screws	M6x40 mm	2	
Expansion screw gaskets	Inner diameter: 5mm; outer diameter: 12mm; SUS304 gasket	2	

3.1.3 Base of 5KWH+ Residential Energy Storage Battery

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	
Base Foot (Optional)	M12, Height adjustable	4	

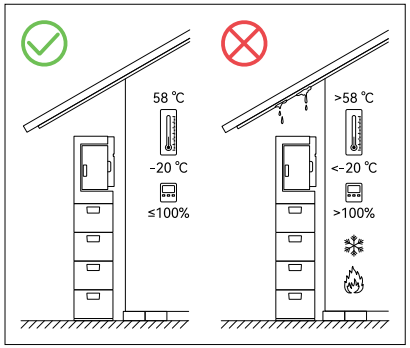
3.2 Preparation before Installation

3.2.1 Preparation of Installation Tools

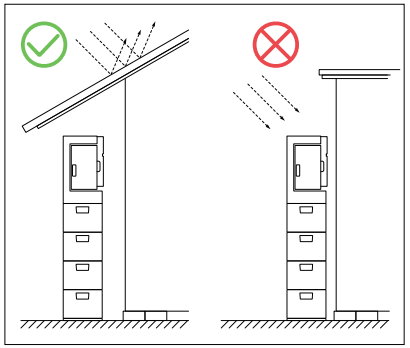
Type	Tools and Descriptions			
Installation	 Electric drill with ϕ6	 Spirit level	 Marker	 Tape measure
	 Hammer	 Phillips PH1 Slotted SL2.5 Allen M2 Screwdriver	 Diagonal pliers	 Stripping pliers
	 Utility knife	 Crimping pliers	 Network cable crimping pliers	 Open-end wrench S=7mm
Safety	 Safety gloves	 Dust mask	 Goggles	

3.2.2 Selection of the Installation Environment

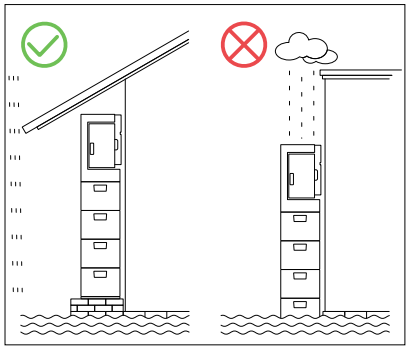
Please select the site according to the relevant requirements. (Install the system in a sheltered area or install an awning to cover the product.)



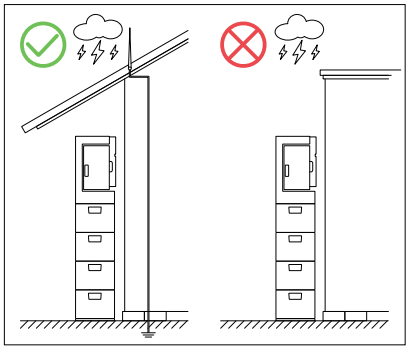
The ambient temperature should be -20 ℃ to 58 ℃ and the relative humidity should be 0% to 100% (no condensation).



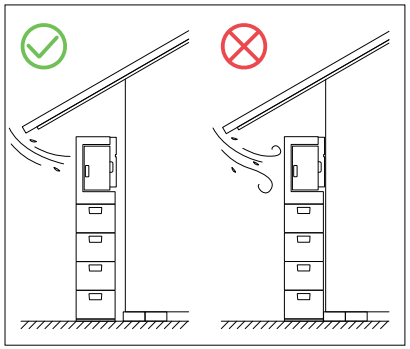
It can be installed outdoors, but must not be directly exposed to sunlight.



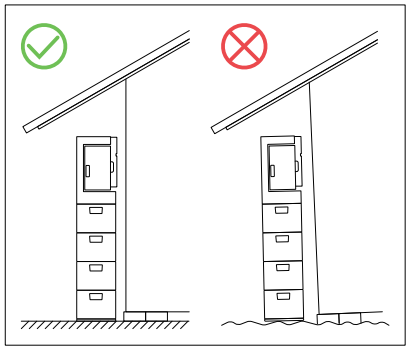
Do not install it in a wet place or in water.



Do not install it in areas prone to lightning strikes.



This system is self-cooled. To ensure proper heat dissipation, please install it in a well-ventilated place.



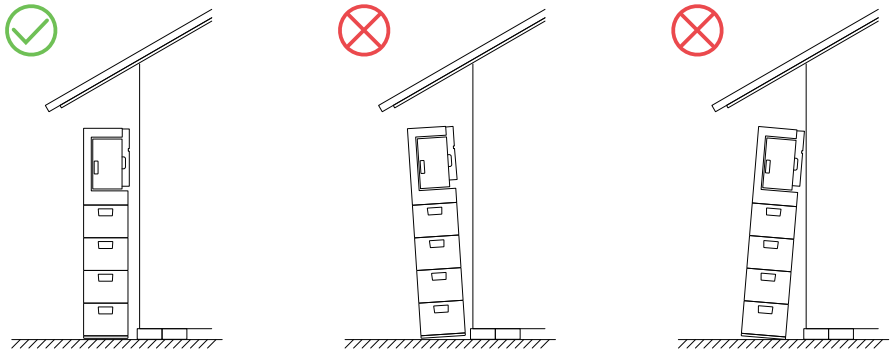
For stability, the system should be installed on solid and flat ground, with the wall being perpendicular to the ground.

3.2.3 Selection of Installation Location

The system should be installed on solid and flat ground that is able to support its weight.

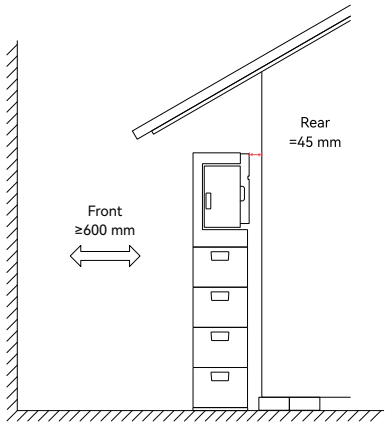
Module Model	HM5/6-05	HM5/6-10	HM5/6-15
Quantity of batteries	1	2	3
Weight (kg)	93	143	193
Size (LxWxH) mm	600x305x778	600x305x998	600x305x1218
Module Model	HM5/6-20	HM5/6-25	HM5/6-30
Quantity of batteries	4	5	6
Weight (kg)	243	293	343
Size (LxWxH) mm	600x305x1438	600x305x1658	600x305x1878

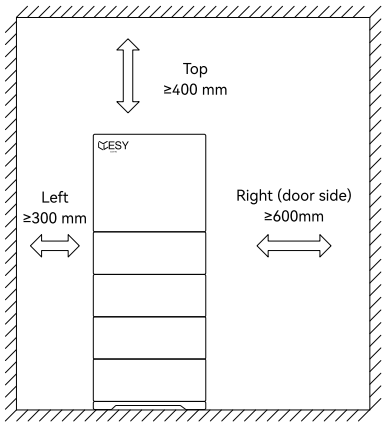
Vertical installation, without forward or backward tilting.



The recommended clearance distances for the system are as follows:

Top	Front	Rear	Left	Right (door side)
≥400 mm	≥600 mm	=45 mm	≥300 mm	≥600 mm



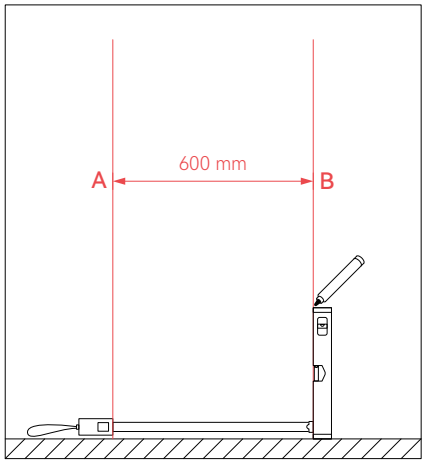


The standard front clearance requirement for the battery system is 600 mm.
In accordance with AS/NZS 5139, if the battery is installed in a corridor, hallway, or lobby, the clearance must be at least 1 meter to ensure safe egress in case of emergency.

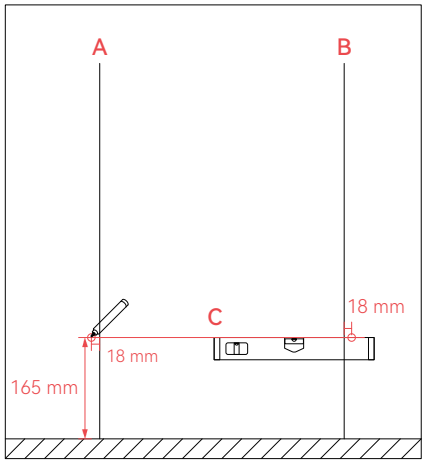
3.3 Installation

3.3.1 Location

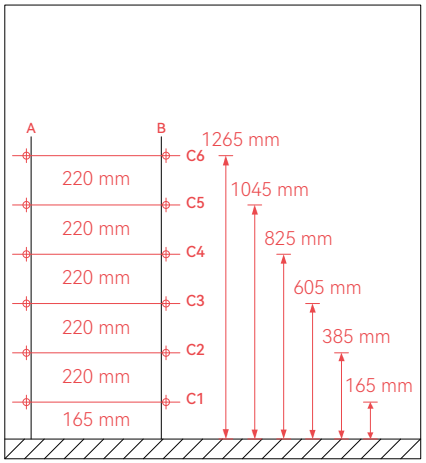
Tools: spirit level, marker, tape measure



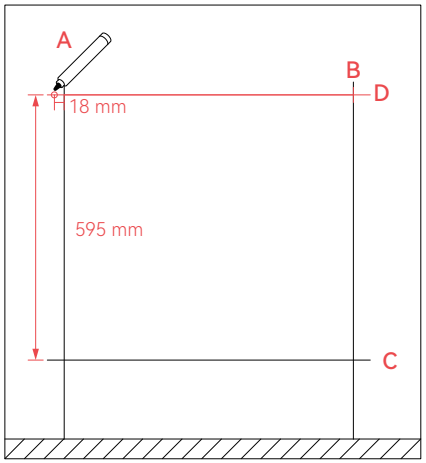
Mark and designate the left and right boundaries of the selected equipment, with a distance of 600 mm between points A and B. Secure a spirit level vertically on each side of the equipment to draw marking lines A and B, ensuring that the lines are perpendicular to the ground.



Perpendicular to marking line A, use a tape measure and a laser level to measure and draw marking line C. The distance between line C and the ground is 165 mm. Mark screw hole positions on the outer side, 18 mm away from the intersection of A, B, and C, and use a spirit level to check if the two hole positions are in a straight line.



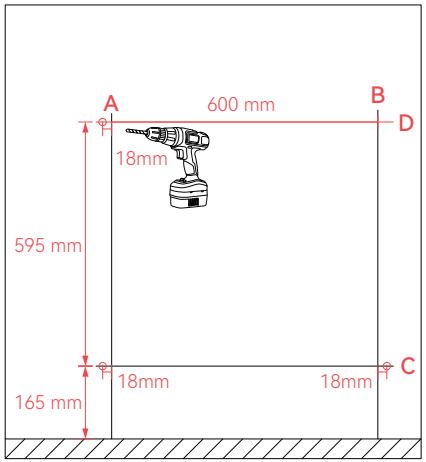
For each additional battery, add 220 mm to the existing base and make corresponding markings.



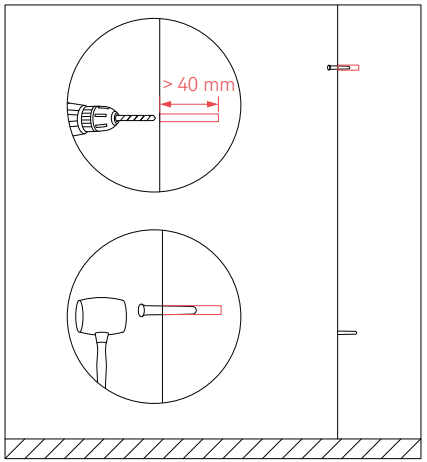
Above marking line C, 595 mm from the top, mark line D. Starting from point A, mark the inverter screw hole position 18 mm to the left of D. Check the distances between each hole position and ensure they are horizontal.

3.3.2 Drilling

Tools: electric drill (bit size: ϕ6mm), hammer, expansion tube (M6x40 mm)with screws



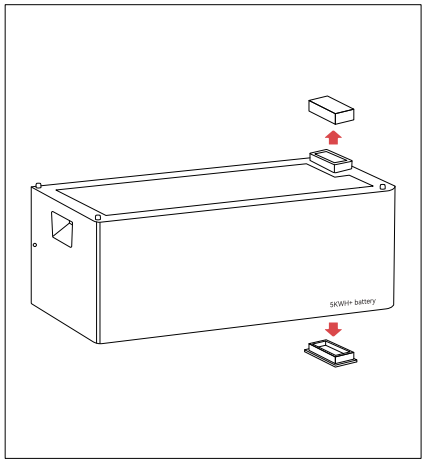
Drill three holes using the electric drill with ϕ6 mm bit as indicated in the figure.



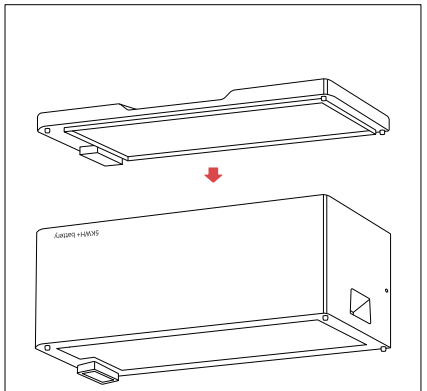
Hammer the expansion tubes into the holes.

3.3.3 Base Installation

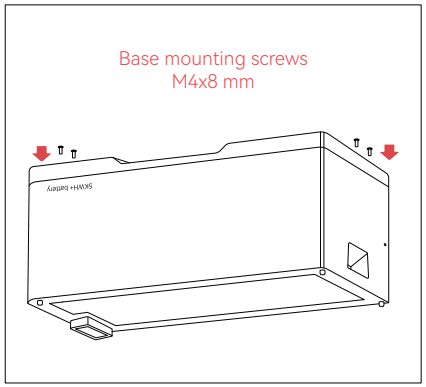
Tools: screwdriver, screws(M4x8 mm)



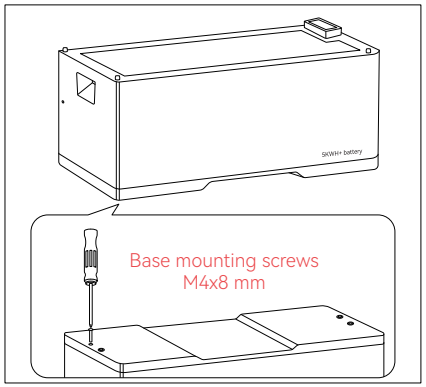
Before installation, remove the dust cover on the top and bottom to avoid damage during installation.



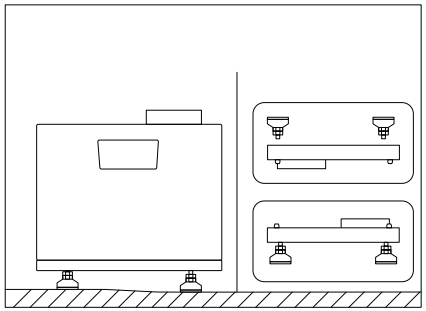
It is recommended to place the battery upside down on a soft surface to avoid scratches. Align the base's fool-proof port with the battery (Do not remove the waterproof gasket on the base), and fasten the base with the battery.



Secure four screws using the screwdriver



Once the installation location has been determined, tighten all screws. Ensure the base is properly fitted with the battery.

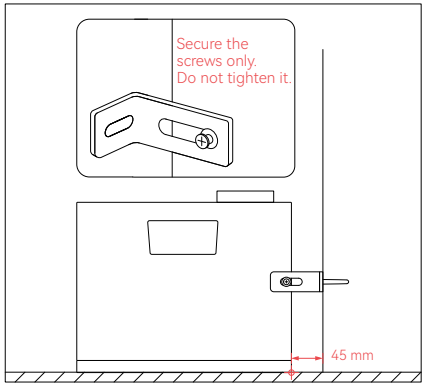


Note

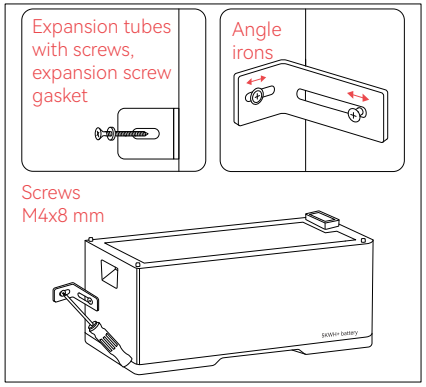
For uneven ground, please consider utilizing base foot accessories.

3.3.4 One Battery Installation

Tools: tape measure, screwdriver, screws (M4x8 mm), angle iron (L79.5x32x25 mm), expansion tubes (M6x40 mm) with screws, gasket (SUS304)



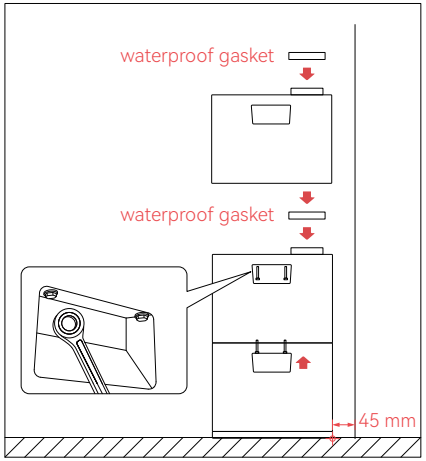
Make a mark of 45mm from the wall, and align the battery (including the base) with the mark, fixed the angle iron to the battery, align the other end with the hole in the wall (Do not tighten the screws).



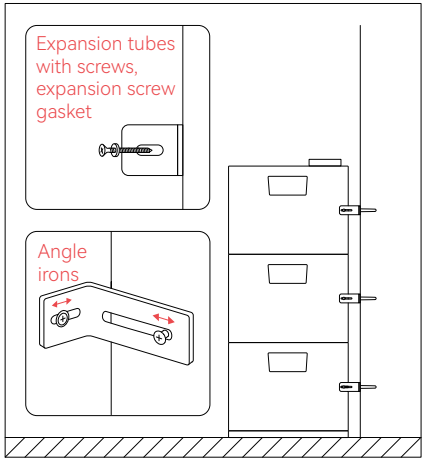
After adjusting the position of the angle iron, pass the expansion screw through the gasket and angle iron, fix it on the wall, after the angle iron is adjusted, then tighten the screws respectively.

3.3.5 Stacking of Multiple Batteries

Tools: tape measure, screwdriver, open-end wrench (7 mm), angle iron screws (M4x10 mm), angle iron (L79.5x32x25 mm), expansion tube (M6x40 mm) with screw, handlebar screws (M4x30 mm), waterproof gasket, gasket (SUS304)



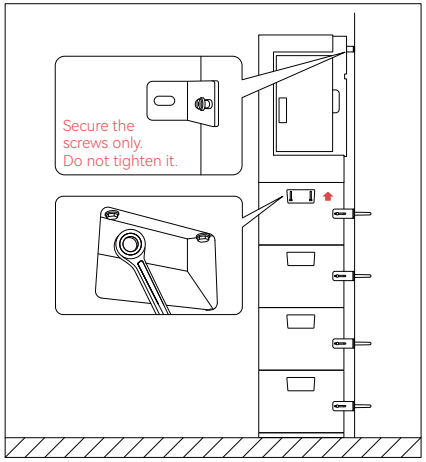
Make a mark 45 mm from the wall, align the battery with the mark. Intall the waterproof gasket, and then stack the next battery. Once a battery is installed, secure its two sides with handlebar screws, and stack them as required.



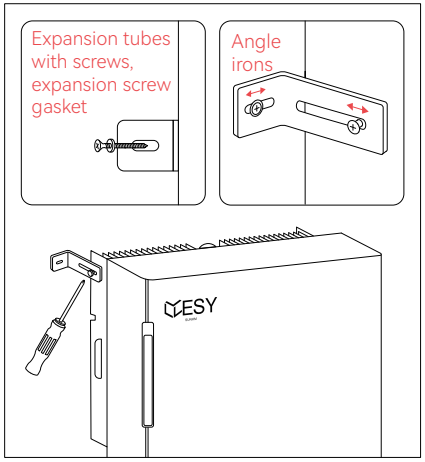
After stacking all the batteries, install the angle iron on the battery, and then fix the expansion screws through the gasket and angle iron onto the wall. Fix each battery first, adjust the angle iron position, and then tighten the screws separately.

3.3.6 Inverter Installation

Tools: tape measure, screwdriver, angle iron screws (M4x12 mm), angle iron of HM Series inverter, expansion tube (M6x40 mm) with screw, handlebar screws (M4x30 mm flange hex screws), waterproof gasket, open-end wrench(7 mm)



Connect the inverter and batteries, fixed them with handlebar screws, then fix the angle iron onto the left cooling fin of the inverter. (Do not tighten the screws).



Align the angle iron of the inverter with the hole in the wall, pass the expansion screw through the gasket and angle iron, fix it on the wall, after the angle iron is adjusted, then tighten the screws respectively.

4 Electrical Connection

4.1 Instructions before Wiring

4.1.1 Cable Requirements

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 local standards and the following table when selecting cables.

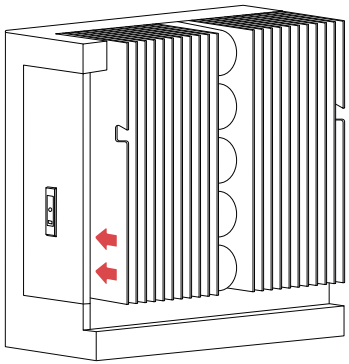
Category	Cable Size	Type of Circuit Breaker	RCD
Grid/ AC Input (L, N, PE)	6 mm²	230 V.a.c./40 A	30 mA/Type B
EPS/Load Output (L, N, PE)	6 mm²	230 V.a.c./32 A	30 mA/Type B
PV1/PV2/PV Input (+, -)	6 mm²	≥600 V.d.c./≥20 A	-

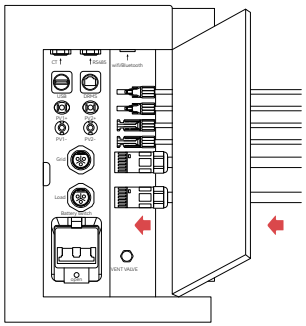
The cable length is generally 2-10m. Cables that are too long may cause deviation from the rated voltage. In this case, the cross-sectional area of the cables should be increased accordingly.

4.1.2 Precautions

Install insulation terminals (with accessories) where the grid input cable, AC load output cable, PV input cable and battery input cable are connected to the inverter. Secure the terminals with tools such as pliers. This can make system connections more secure and reliable.

Install all cables through the back of the door to avoid safety hazards.





Caution

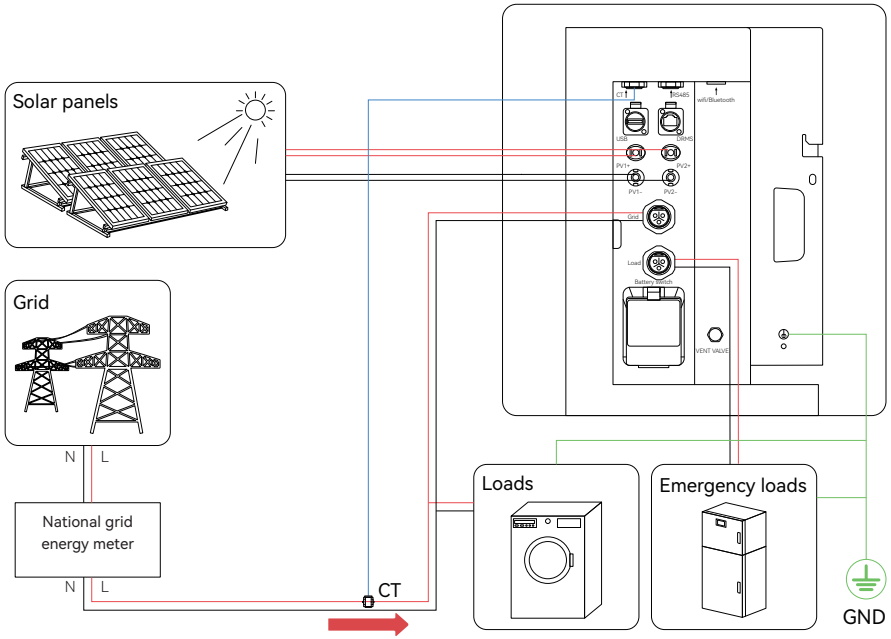
Before installation and use, use a wire (6 mm²) with lug as the ground wire.

The capacity of the load output terminal of the inverter is as follows:

1. Inductive loads (e.g. air-conditioners, washing machines and motors): the individual maximum power is 2.2 KVA, and the total maximum power is 5 KVA for HM5 and 6KVA for HM6.
2. Capacitive loads (e.g. computers and switching power supplies): the total maximum power is 5 KVA for HM5 and 6KVA for HM6.

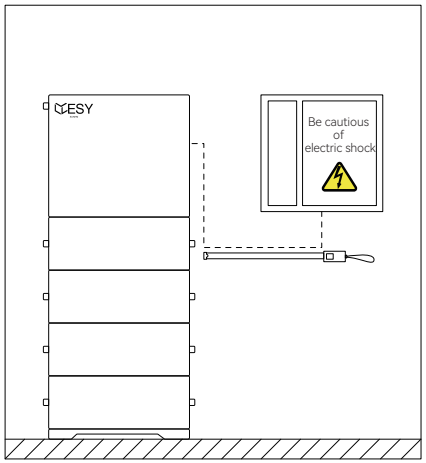
The above capacity is based on the system being connected to a power grid or battery with sufficient power. If the power is supplied solely by the PV module, the maximum single off-grid load is usually half of the real-time power of the PV module.

4.2 Schematic Diagram of System Connection

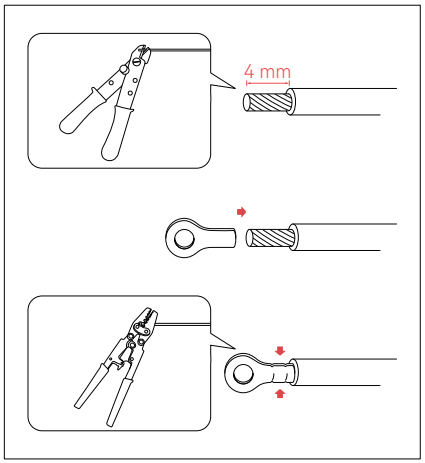


4.3 Ground Wire Connection

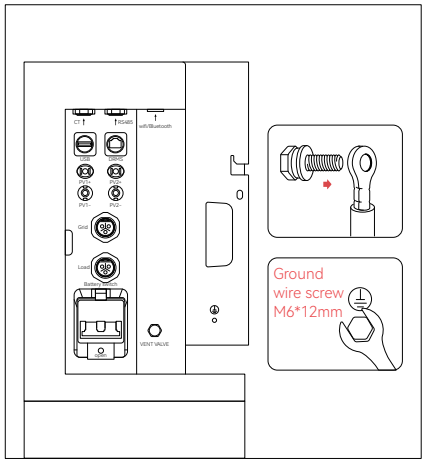
Tools: screwdriver, ground wire screw (ϕ 6mm), stripping pliers, crimp cable lug, crimping pliers, tape measure, ground wire



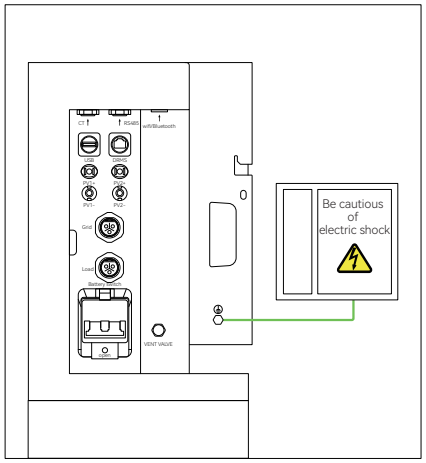
Measure the distance between the product and the power distribution box using the tape measure, and select a ground wire of appropriate length.



Strip the ground wire insulation by 4 mm using the stripping pliers, install the ground wire terminal, and press it tightly with crimping pliers.



Fasten the ground wire terminal to the right radiator of the inverter using the ground wire screw (ϕ6mm), and ensure that the other end of the wire is properly grounded with the grounding impedance of 0.1Ω or less.



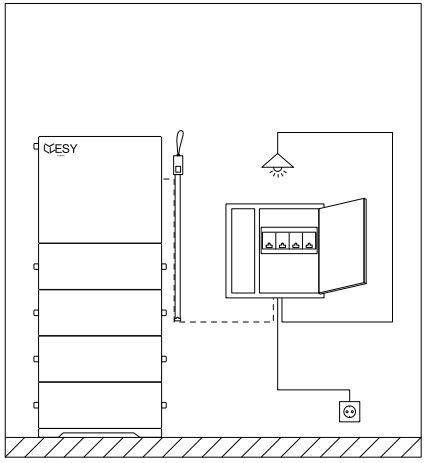
Ensure the ground wire is properly connected to ensure safety in installation and use.

Note:

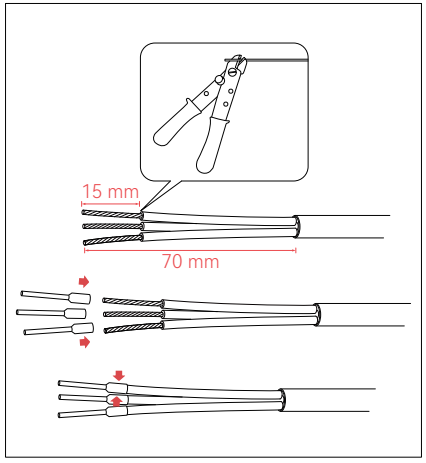
The power is neutral continuity maintained internally. Please ensure to correct external grounding connection for the power. If the power shows a 'ground fault' after system installation, please check if the grounding is compliant with the requirements.

4.4 Load Connection

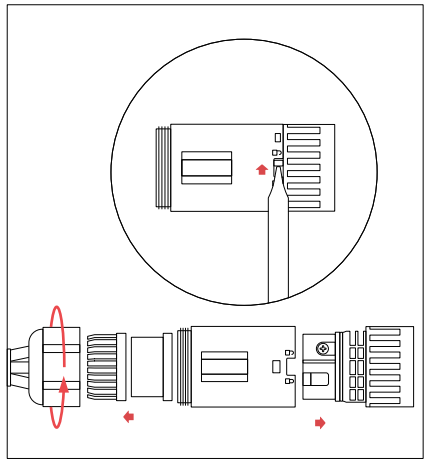
Tools: Phillips screwdriver, (ϕ2 mm), cable terminal (single-phase three-wire), stripping pliers,tape measure, cable (L, N, PE)



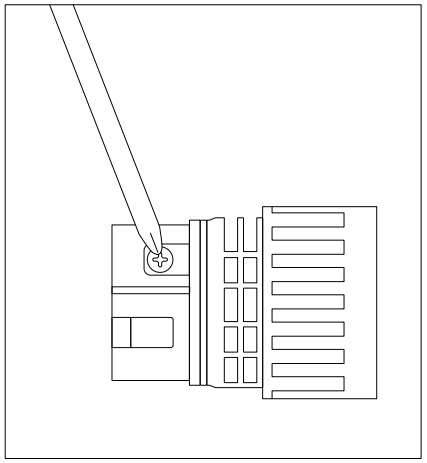
Measure the distance between the product and the power distribution box or load terminal using the tape measure,, and select a cable of the appropriate length.



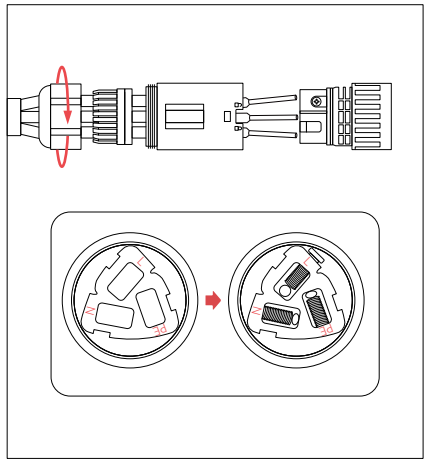
Strip the cable sheath by 70 mm and core insulation by 15 mm using the stripping pliers. (Note: Use ferrule crimping pliers to crimp an insulated cord end terminal 6 mm² onto the cable.)



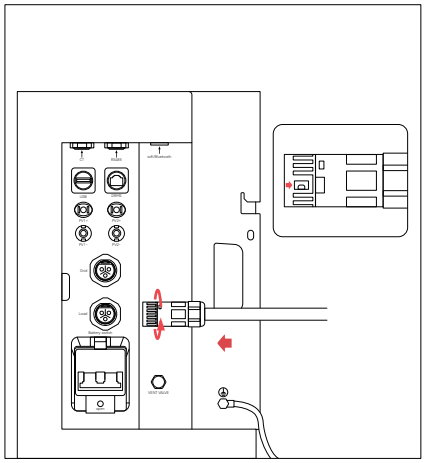
Twist the terminal at the back end, open the rear cover, and separate the waterproof rubber ring. Use a screwdriver to open the other end of the terminal's fuse, and then pull out the front end of the terminal.



Use the Phillips screwdriver to remove the screws from the front terminal.



Connect the cables to the terminals according to the sequence shown in the diagram and secure them using screws. Tighten each terminal in sequence from front to back.



Plug the terminal into the Load interface, and press the buckle as shown. Then check all wiring for firmness.

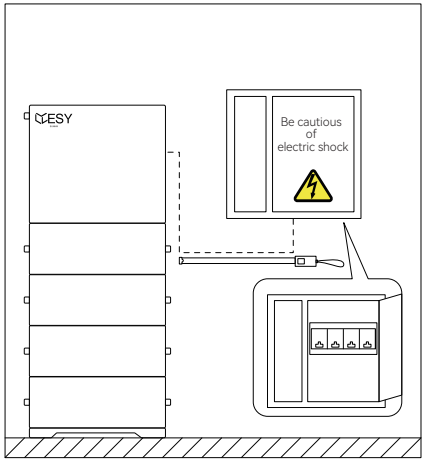
⚠ Warning!

While the system is in operation, there will be voltage at the output terminal of the load. For this reason, do not use the system without the protective cover at the load's output terminal or touch the load's output terminal and connecting cable.

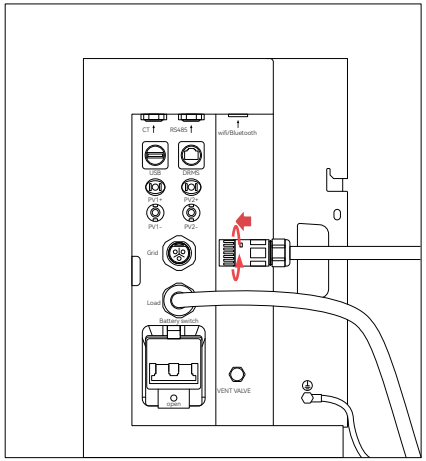
The system does not support parallel operation. Do not connect the load terminals in parallel.

4.5 Power Grid Connection

Tools: Phillips screwdriver, cable terminal (single-phase three-wire), stripping pliers, tape measure, cable (L, N, PE)



Turn off the circuit breaker of the power grid. Measure the distance to the power distribution box using the tape measure, and select a cable of appropriate length. Secure the terminal according to the load connection steps in 4.4.



Insert the terminal into the Grid interface, and rotate the tail part of the terminal until it is secured, and check.

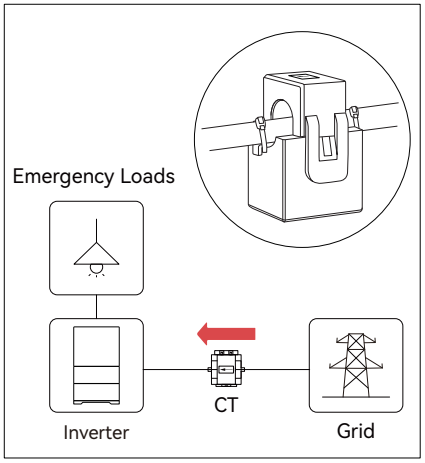
Caution

Make sure that the equipment is properly grounded before operation. Do not connect important backup loads to the Grid side whether the equipment is connected to the grid or not. Doing so may result in the equipment failing if the power grid is cut off.

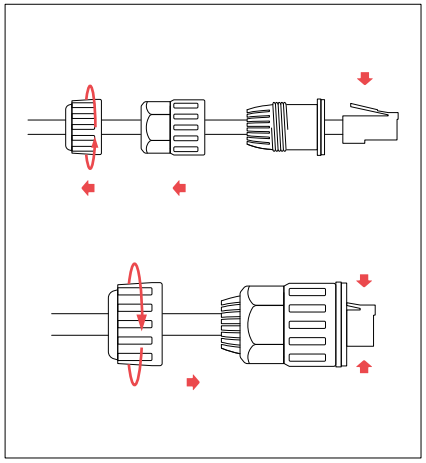
Install an AC circuit breaker between the inverter and the power grid before connecting the power grid.

The grid voltage and frequency should be within the permissible range of the equipment.

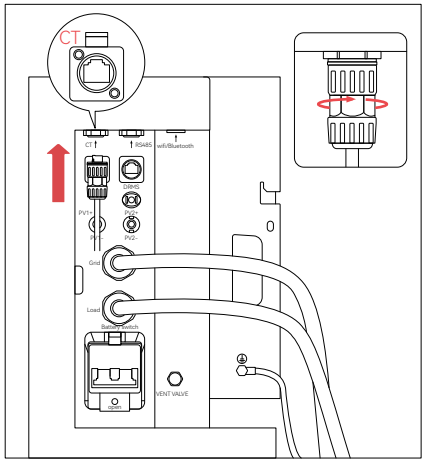
4.6 CT Installation Instruction



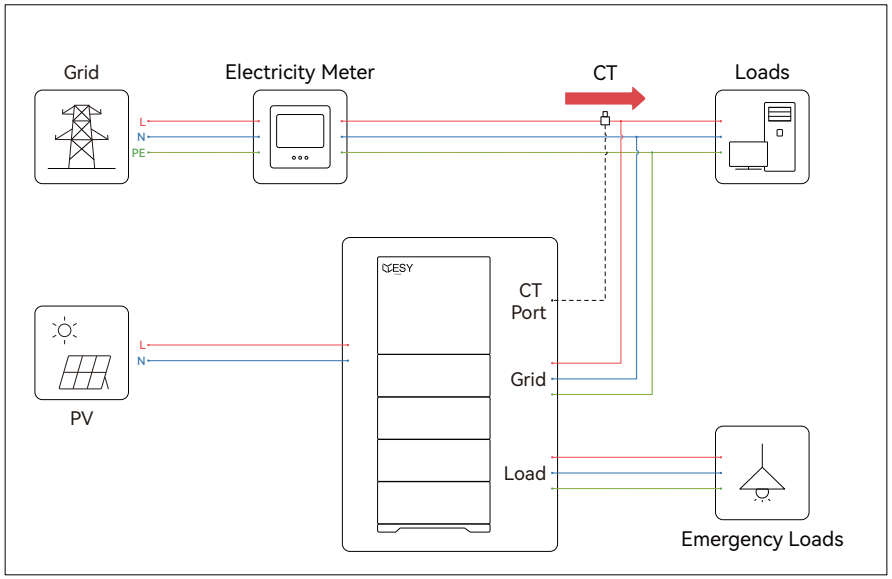
Place the CT on the grid side, with the arrow on the CT ("→") pointing towards the inverter and household loads.



Guide the cable with the current transformer (CT) installed through the terminals as shown in the diagram. Push the rear terminal forward, press the crystal head into place, and then tighten the end of the terminal.



Insert the terminal into the CT interface, tighten the terminal and ensure the cable is connected securely.

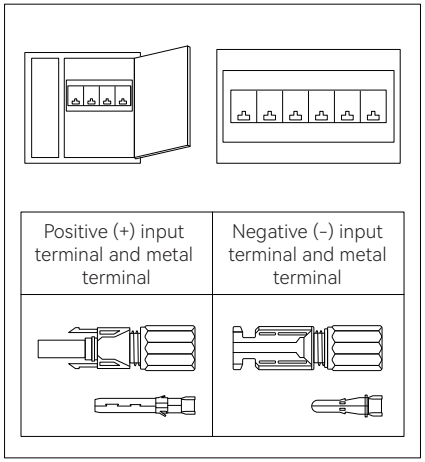


System Installation Diagram

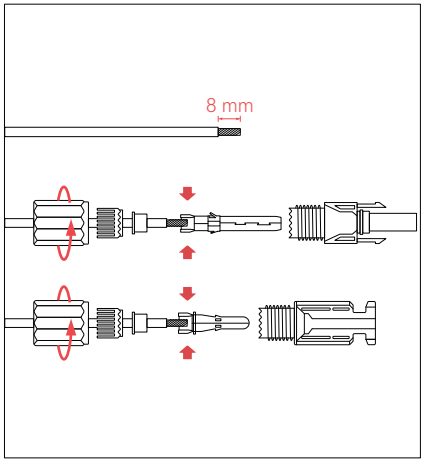
4.7 PV Connection

External DC isolators complied with AS 60947.3 are required to be installed for PV ports during the final installation as requested by Cl.7.3.4 from AS/NZS 4777.2.

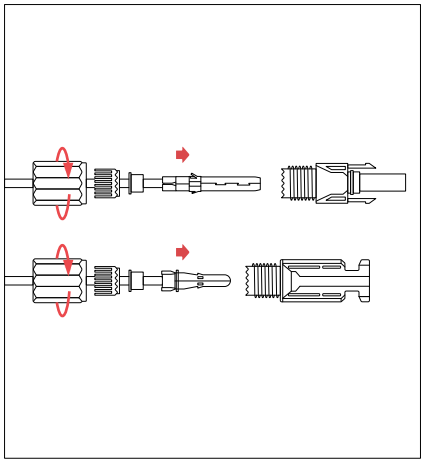
Tools: PV+ connector, PV- connector, PV crimping pliers



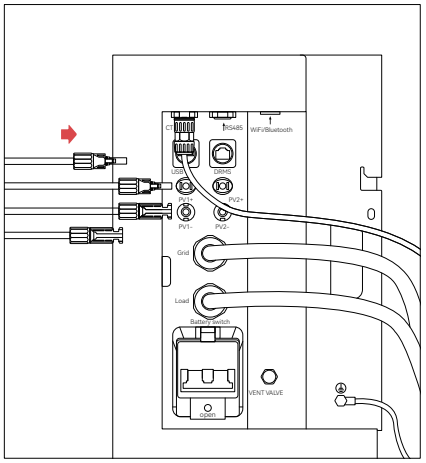
Disconnect all circuit breakers of the inverter and PV module. Make sure that the cables of the inverter and PV module are connected in a power-off condition. Check the external input terminal of the PV module for damage, and confirm its polarity.



Strip the DC cable insulation of the PV module by about 8 mm to expose the copper wire. Install the copper wire through parts as shown in the figure above. Insert the metal core of the connector and tighten it with crimping pliers.



Insert the terminal into the wiring slot, until you hear the sound indicating a proper connection. Tighten the end of the terminal. Ensure the cable and terminals are connected securely.



Determine the polarity of the PV input terminal of the inverter and that of the machine. Connect the PV input cable to the inverter. Ensure the cables are connected properly.

Caution

Make sure that the maximum input voltage of the HM Seriesresidential energy storage system does not exceed 550V (since the open circuit voltage of the PV module is higher at low temperature than that at normal temperature; and the recommended power at normal temperature is 500V or below).

All PV modules must be of the same type and mounting angle.

The input voltage and current range of the PV modules used should meet the parameter requirements of ESY SUNHOME.

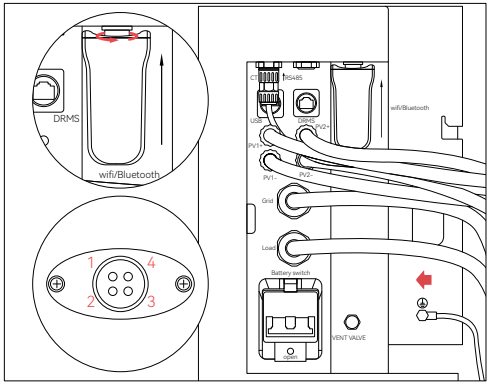
Warning

Since the non-isolated topology is applied to the circuit between the system's PV modules and the power grid, please use monocrystalline silicon or polysilicon PV modules only.

PV modules must be installed by professionals. After PV modules are installed, ensure the polarity of the connected cable of the PV array is correct using a voltmeter (DC voltage range: above 1,000V), and make sure that the open-circuit voltage does not exceed the specified value. When the ambient temperature is higher than 10℃, the open-circuit voltage of the PV array must not exceed 90% of the maximum DC voltage of the equipment. Otherwise, the voltage of the PV array may exceed the maximum input voltage of the equipment at low temperatures, which may cause damage to the equipment.

4.8 Communication Interface

4.8.1 WiFi/Bluetooth Communication Interface (Optional)



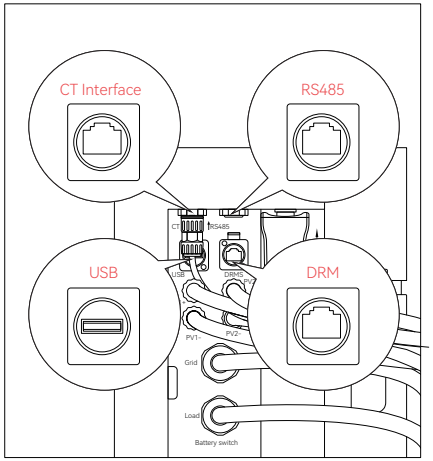
Pin definitions

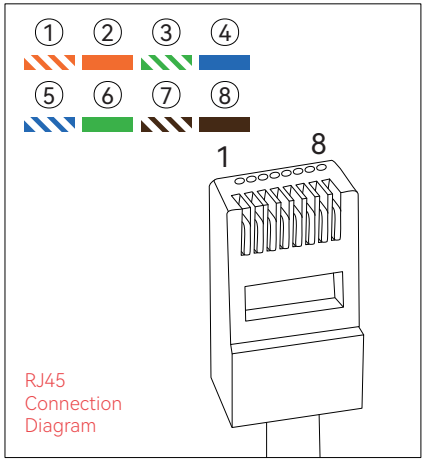
1 Inverter VCC
2 Ground wire GND
3 Data communication A
4 Data communication B

Connection

Align the slot of the WiFi module with that of the WiFi/Bluetooth interface, and insert and secure the WiFi communication module.

4.8.2 Interface Description



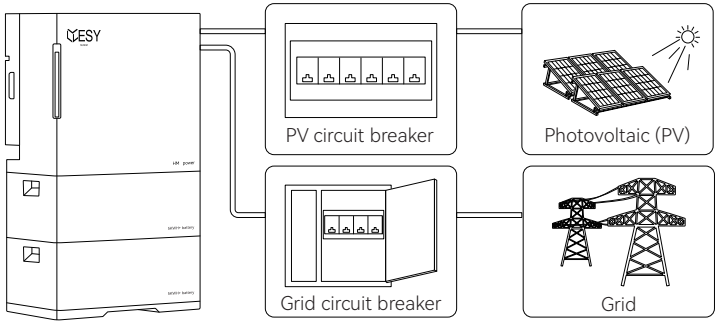


CT	(RJ45 Interface)	
Interface Description	Electricity meter connection.	
Pin Definitions	1: CT_N （red wire） 8: CT_P （black wire）	4: blue data communication CT_RS485- 5: blue-white data communication CT_RS485+
RS485	**(RJ45 Interface)**	
Interface Description	Device Interface	
DRM	**(RJ45 Interface)**	
Interface Description	This interface is only for Australian products. DRED control (for Australia & New Zealand only) DRED means the demand response enabling device. According to the requirements of AS/NZS 4777.2:2010, the user should support the demand response mode (DRM), which is applicable to inverters conforming to RJ45 requirements of the AS/NZS 4020 standard. This mode is for DRMS connections.	
Pin Definitions	1: DRM1/5 3: DRM3/7 5: REF GEN/0 7: Reserved V+	2: DRM2/6 4: DRM4/8 6: COM LOAD/0 8: Reserved V-
USB	**(USB Interface)**	
Pin Definitions	Reserved communication interface for equipment maintenance	

4.9 Power-on

Close the circuit breakers and conduct a power-on check according to the following steps.

1. Power grid: after the circuit breaker of the power grid is closed, the system will be powered on and started. Then you can configure the network and check the system parameters using the APP. See Chapter 5 for network configuration.
2. HM Series inverter: when the battery circuit breaker of the inverter is closed, the left light bar of the inverter will flicker continuously and emit a buzzing sound, indicating that the system has been started.
3. PV: when the PV circuit breaker is closed, the equipment will be powered on and started.



5 ESYSUNHOME APP

5.1 ESYSUNHOME APP

5.1.1 Download Address

Please download it at www.esysunhome.com or Scan QR Code.

iOS Android

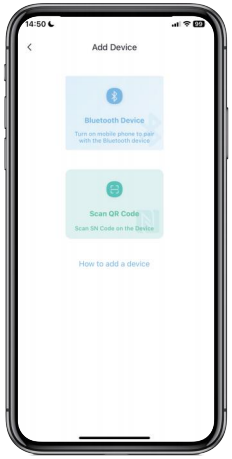
5.1.2 Registration and Installation

Download and install ESYSUNHOME, enter the APP, complete the registration with your email address, and log in.
An authorization code is required for operator registration. Contact the manufacturer to get the authorization code.
After registration, the user should contact the operator to confirm that the APP is installed before using the APP.

5.2 Network Configuration

5.2.1 Install New Device

Please install the device according to the above instructions and ensure the device works properly.



5.2.2 Add New Device

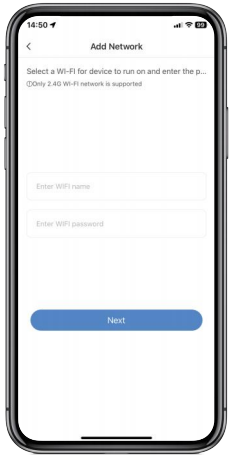
Open the APP, tap "My Device" and "Add", and select Bluetooth or scan the SN code to pair the device.

You can scan the QR code of WiFi-IOT Pro to get the SN code.

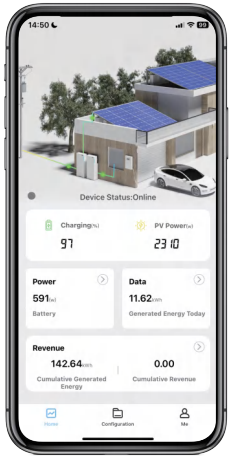
5.2.3 Device Network Configuration

Open the APP, log in to the account, tap "Me", and configure the network for the device. The APP will request you to give Bluetooth permission. Once you have given the Bluetooth permission, tap "ESYSUNHOME_ + SN code" and enter your WiFi name and password in the pop-up interface. Tap "Next" to configure the network, as shown below.

Return to the home page of the APP and wait for a moment to view the system data.

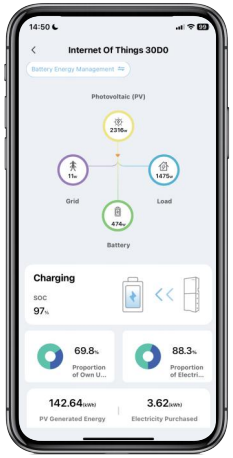


5.3 Data Monitoring



5.3.1 3D Scene Graph

Once the device has been successfully paired, enter the home page of the APP to view the 3D scene graph, including the power grid, HM Series residential energy storage system and load. The direction in which the green cursor moves indicate the flow of energy, and you can monitor the real-time status of the entire system from this view.



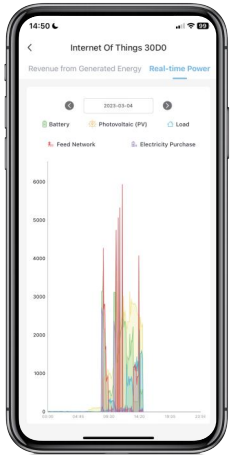
5.3.2 Energy Flow Diagram

Tap the 3D scene graph to enter the energy flow interface, which shows the energy flow direction and real-time power of the PV module, power grid, battery and load, as well as other important information such as battery status, self-consumption ratio, and proportion of sold electricity.

5.4 Data Statistics

5.4.1 Real-time Power

Tap "Power" on the home page to enter the real-time power display interface. In the statistical chart, you can see the real-time power of the battery, PV module, load, sold power and purchased electricity in the curve form. You can also view the one-day real-time power curve.



5.4.2 Electricity Consumption Data

Tap “Data” on the home page to enter the electricity consumption data interface. The statistical chart displays bar graphs of daily, monthly, and yearly electricity consumption, load capacity, PV power generation, grid power sold, and purchased electricity. You can view the details by tapping on the respective items.

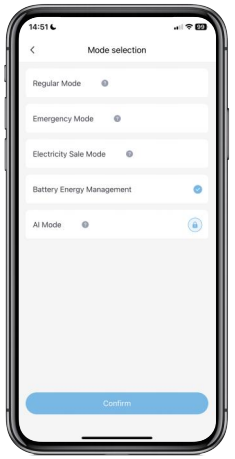
5.4.3 Revenue Data

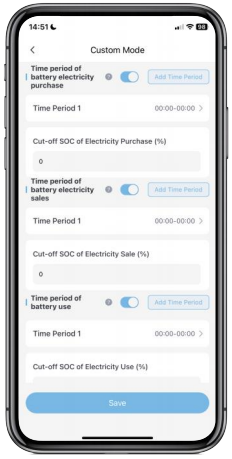
Tap "Revenue" on the home page to enter the revenue display interface. In the statistical chart, you can view the daily, monthly, and yearly data, including the revenue of power generation, the revenue of sold electricity, and average revenue. Tap the bar charts to see the details. Tap the electricity price settings to set the electricity purchase and sales prices for different time periods in a day. If you do not change settings, the price will be 1 by default.

5.5 Power Supply Control

5.5.1 Mode Switching

Open the client APP, log in and enter the home page. Tap the 3D scene graph to enter the energy flow diagram page. The current working mode will be shown in the upper left corner. You can tap it to enter the mode list and select an appropriate mode.





5.5.2 Battery Energy Management

Tap the battery energy management options in the column of the mode list. You can set the battery's electricity purchase time, electricity selling time, and service time based on your electricity needs. The electricity purchase time of the battery refers to when electricity is bought from the power grid to recharge the battery when the PV is insufficient for battery charging. The electricity selling time of the battery refers to when the electricity of the battery is sold when the PV electricity is insufficient for sales at the maximum output power of the system.

5.5.3 Power-on/off

This function is used to remotely turn on and off the system. The system will be on standby if it is turned off.

5.6 Remote Monitoring

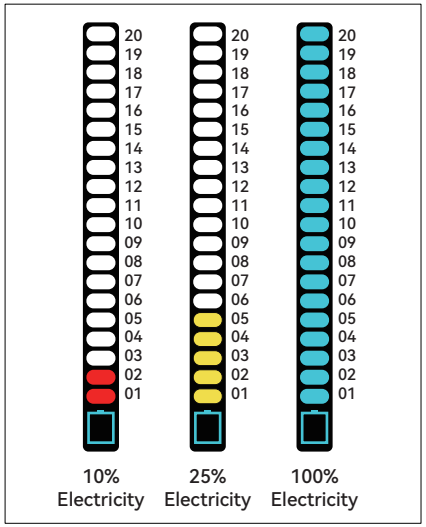
5.6.1 Alarm Information Monitoring

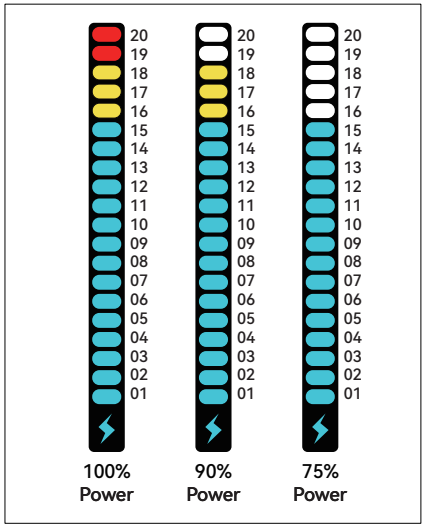
When the energy storage system sends an alarm, a reminder will pop up on the home page of the APP.

5.6.2 OTA Upgrade

In the OTA upgrade state, the system will be in standby status without any output. Please use the power grid to supply power.

6 Light Bar Indication





6.1 Battery Status

The symbol " " at the bottom of the light bar indicates the power level. It consists of 20 divisions, which represent 5% of electricity, respectively. As long as the power changes by 5%, the light will be ON for 60 s and then OFF.

6.2 Power Status

The symbol " " at the bottom of the light bar indicates the power. It consists of 20 divisions, which represent 5% of the power, respectively. As long as the power changes by 5%, the light will be ON for 60 s and then OFF.

6.3 Alarm Status

When the indicator at the bottom of the light bar is OFF and the top three indicators are ON, it means that the device has an alarm or fault. If the device is faulty, please contact professionals for solutions in time.

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

7 System Maintenance

7.1 Start Up Procedure

Startup Procedure:

Step 1: Turn on the grid circuit breaker to power up the system.
Step 2: Turn on the battery switch on the inverter.
Step 3: Turn on the photovoltaic (PV) isolator.
Step 4: Turn on the load circuit breaker and ensure the load is operating normally.

7.2 Shutdown Procedure and Periodic Maintenance

To ensure reliable and long-term service of the system, perform the following steps to check and power off the system once a month:

Step1: Turn off the device and disconnect the breakers for battery, photovoltaic, grid, and load.
Step2: Ensure there is not too much dust on the device surface.
Step3: Ensure the device is in a non-humid environment.
Step4: Close the breakers for load, grid, photovoltaic, and battery, and start the device.

7.3 Precautions for Long-Term Non-Use

If the inverter is not used for more than 7 days, please disconnect the circuit breakers for the battery, photovoltaic system, grid, and load.
If the inverter is equipped with a battery and the system is not used for more than 3 months, please switch the circuit breakers for the grid and battery and start the system to charge the battery once.

7.4 Battery Maintenance

Caution

Keep the battery clean. Clean the terminals and connectors in time.

Do not use batteries with different types and capacities together. Instead, use batteries of the same model.

Before installing or replacing the batteries, removing metal objects from your hands, such as watches and rings, can help prevent short circuits and potential burns.

Warning

Battery maintenance should be performed or supervised by those with relevant knowledge. In addition, necessary precautions should be taken.

Batteries may cause electric shock and high short-circuit current.

Prohibition throw the batteries into fire. They may explode.

Prohibition disassemble or destroy batteries. The electrolyte released is harmful to the skin and eyes. It may be toxic.

8 After-sales Service

Service email: support@esysunhome.com

Or, contact the local installer.