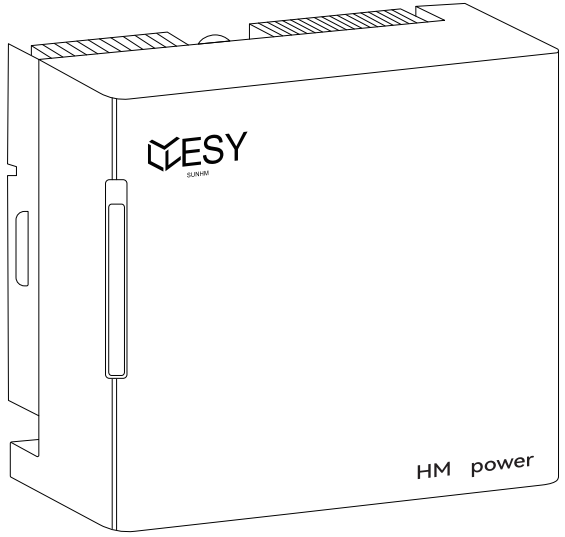
HM Series Household Inverter

User Guide & Installation Manual

(ESYSUNHOME HM5/ESYSUNHOME HM6)



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

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 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, 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.

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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 knowledge able 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.
- Equipment 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 equipment 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 equipment except trained personnel and professionals.

1.3 Important Safety Information

- Before equipment 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 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, improper use or incorrect installation or operation may result in serious personal injury or device damage. The transportation, loading and unloading, installation, start-up 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 equipment 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 inverter'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 equipment for life support systems or medical equipment, as it cannot guarantee power in all situations.

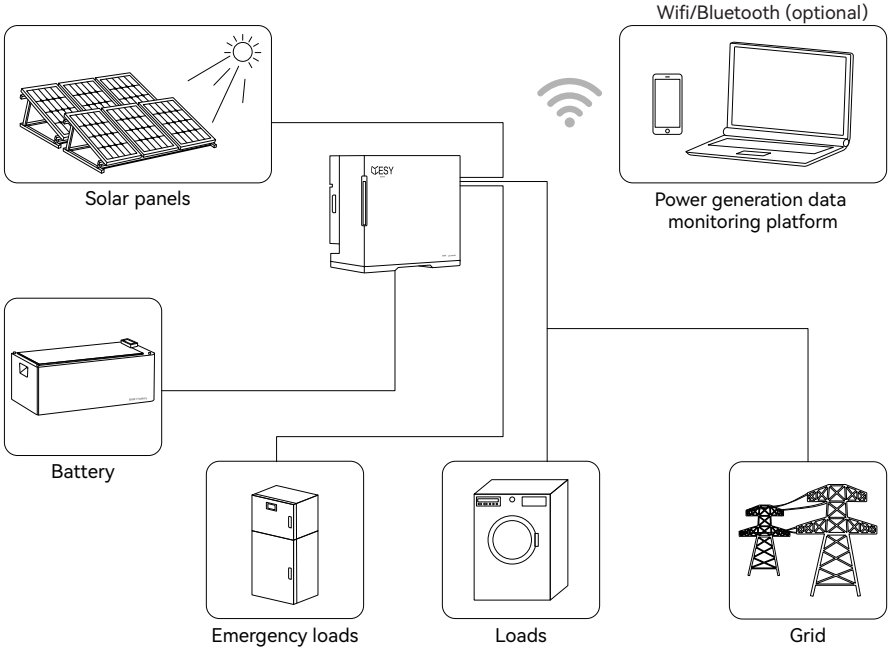
2. Safe Transportation and Storage

- When transporting the inverter, it must be packed in the original packaging to ensure the safety of the equipment during transportation.
- Upon receiving the goods, please inspect the external packaging of the inverter and then open the box for a comprehensive inspection.
- If any damage to the inverter occurs during transportation, please notify the shipping company. The shipping company is responsible for any equipment damage caused during transportation. If necessary, seek assistance from the installer or manufacturer.
- When handling inverters weighing 35kg or more, please use appropriate equipment or work together with multiple people.
- When storing the equipment, please use the original packaging and store it in a cool, dry, and well-ventilated area to prevent damage caused by moisture.

3. Product Introduction

3.1 Overview

ESY SUNHOME HM Series Intelligent Home Inverter is a power conversion equipment. It can be connected with the battery, and the Internet, allowing connections to the grid, photovoltaic panels, and the Internet of Things. It provides electricity for homes, small businesses, farms, and other locations.



3.2 Product Parameters

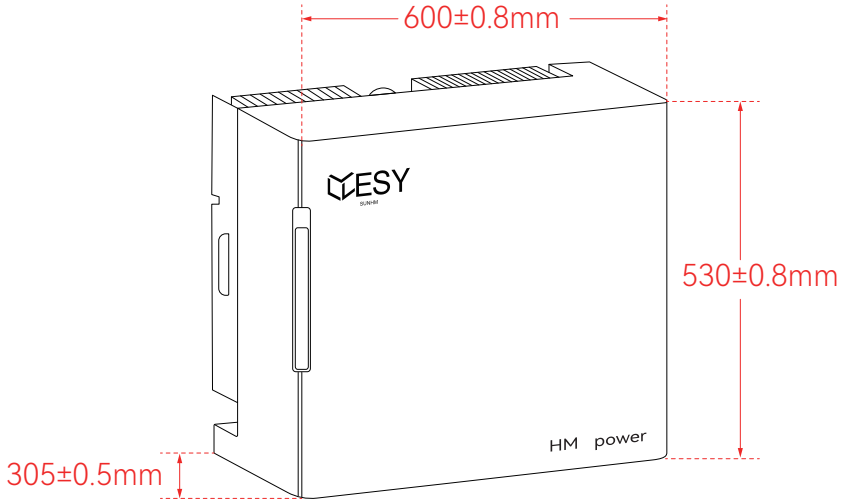
Model	ESYSUNHOME HM 5	ESYSUNHOME HM6
Rated power	5000 W	6000 W
Operating mode	Monitoring software	
PV input		
Max. input power	8000 W	
Max. input voltage	550 Vd.c.	
Rated input voltage	360 Vd.c.	
Starting voltage	150 Vd.c.	
Min. operating voltage	100 Vd.c.	
MPPT operating voltage range	100 Vd.c.~540 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		
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	6000 W
Max. input/output apparent power	5000 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	
Frequency range	50 Hz±5 Hz	
Rated input/output current	21.74 Aa.c. @ 230 V	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	Lithium-ion	
Grid charging	Support	
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	97.8%	
MPPT efficiency	99.9%	
Others		
Topology	High frequency isolation (for battery)	
	Non isolated for PV	

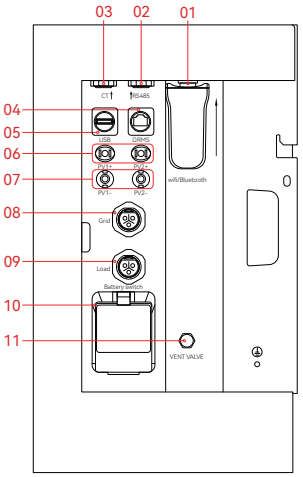
Others		
Protection Rating	IP 66	
Dimensions (L*W*H)	600±0.8 mm*305±0.5 mm*530±0.8 mm	
Net weight	36.4±0.5 kg	
Gross weight	42.1±0.5 kg	
Installation	Installation on ground	
Operating temperature	-25~60 ℃ (derating above 45 ℃)	
Storage temperature	-25~70 ℃	
Cooling mode	Natural cooling	
Altitude	≤4000 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.	
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 PV/Battery); OVC III (for AC Grid Mains)	
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	

3.3 Appearance

3.3.1 Outline Dimensions



3.3.2 Port Description



Lateral marks on the HM Series Inverter chassis

Purpose of each lateral mark on the HM Series Inverter chassis

S/N	Mark	Purpose
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

3.3.3 Nameplate Identification

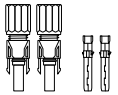
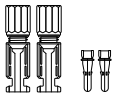
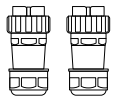
MODEL: ESYSUNHOME HM	ESYSUNHOME HM Series: model, indicating that the inverter specification is 5 kW.
	Pay attention to safety.
	Pay attention to high surface temperature.
	Be cautious of electric shock.
	Prior to attempting any repair, electrical installation or accessing any live parts, make sure that 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.

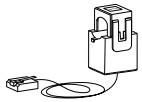
4. System Installation

4.1 Packing List

4.1.1 Packing List of HM Series Residential Energy Storage System

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

Name	Specifications	Quantity	Schematic Diagram
Residential energy storage system	HM inverter	1	
Expansion tubes with screws	M6×40mm	1	
Expansion screw gasket	Inner diameter: 5mm; outer diameter: 12mm; SUS304 gasket	1	
Angle iron	L60.5×32×25mm	1	
Angle iron screws	Cross recessed outer hexagonal double-gasket screw, M4×12mm	2	
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, M6×12mm	1	
Ring-shaped crimp cable lug	RNB5.5-6,48A, Φ=6.5mm,5.6×23mm	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	

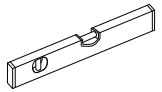
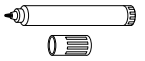
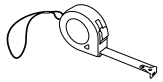
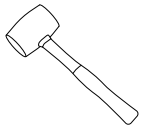
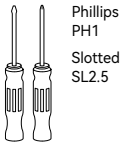
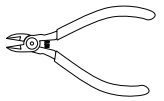
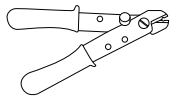
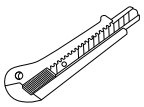
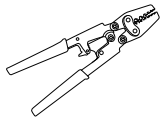
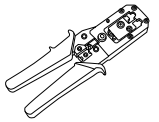
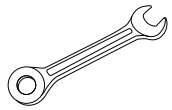
Name	Specifications	Quantity	Schematic Diagram
Key		1	
Manual	HM Series, English	1	
WiFi-IOT Pro	Optional	1	
CT	CTF16T-1k-50 50A-50mA	1	

4.1.2 HM Series Inverter Base Packing List

Name	Specifications	Quantity	Schematic Diagram
Base	600mm×305mm×44.1mm	1	
Waterproof connector cover	Silicone, black, matte, 110×39.9×9 mm (installed on the base)	1	
Base mounting screws	PM4×8mm	4	

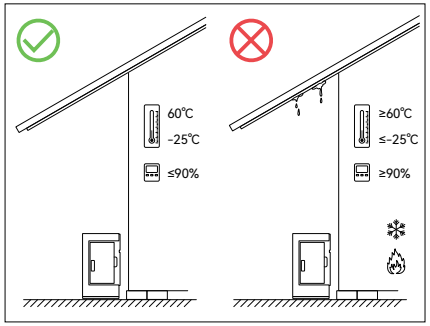
4.2 Preparation before Installation

4.2.1 Preparation of Installation Tools

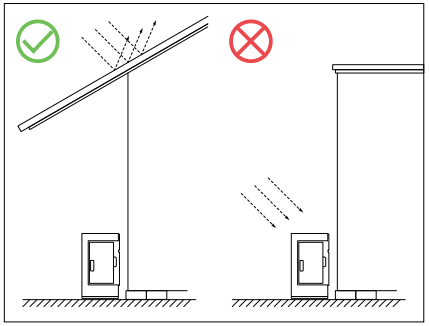
Type	Tools and Descriptions			
Installation	 Electric drill with ϕ6	 Spirit level	 Marker	 Tape Meausre
	 Hammer	 Phillips PH1 Slotted SL2.5 Screwdriver	 Diagonal pliers	 Stripping pliers
	 Utility knife	 Crimping pliers	 Network cable crimping pliers	 Open-end wrench S=7mm
Safety	 Safety gloves	 Dust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

4.2.2 Selection of the Installation Environment

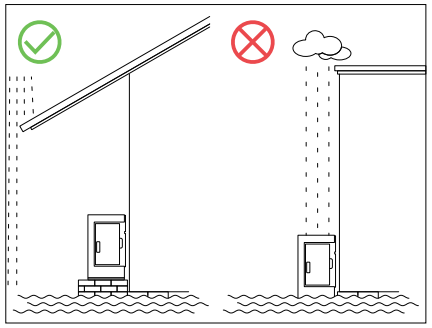
Please select the site according to the relevant requirements. (Install the system in a sheltered area or install an awning to cover the product.)



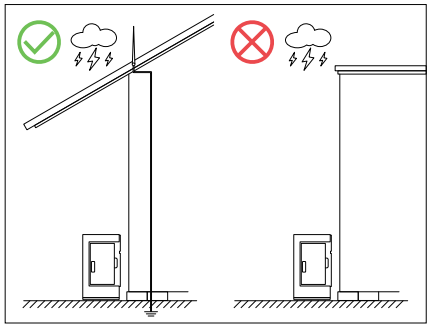
The ambient temperature should be -25℃ to 60℃and the relative humidity should be 0% to 90% (no condensation).



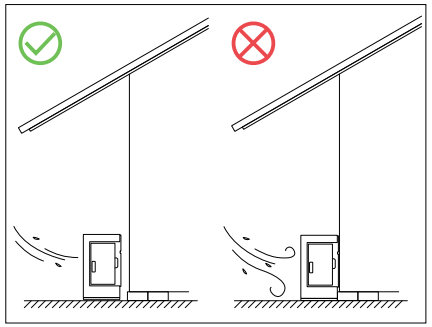
It can be installed outdoors, but must not be directly exposed to sunlight.



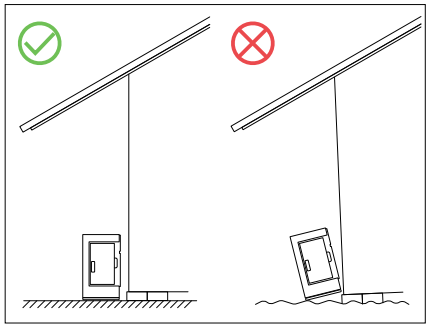
Do not install it in a wet place or in water.



Do not install it in areas prone to lightning strikes.



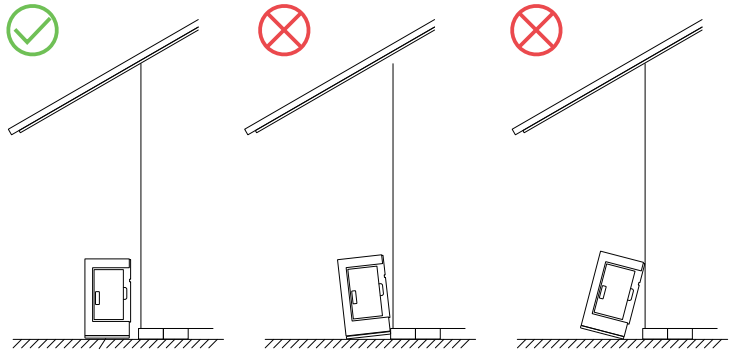
This product is self-cooled. To ensure proper heat dissipation, please install it in a well-ventilated place.



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

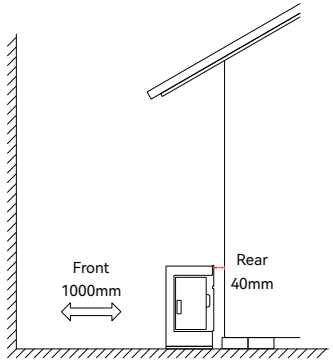
4.2.3 Selection of Installation Location

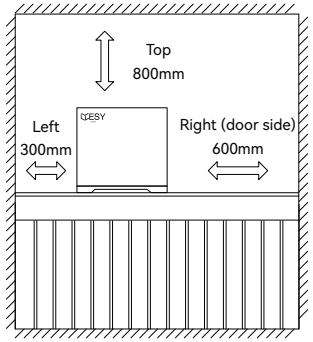
Vertical installation, without forward or backward tilting.



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

Top	Front	Rear	Left	Right (door side)
800mm	1000mm	45mm	300mm	600mm

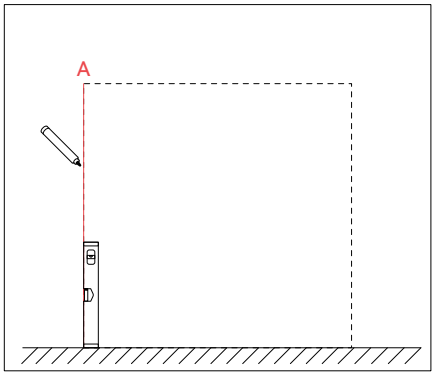




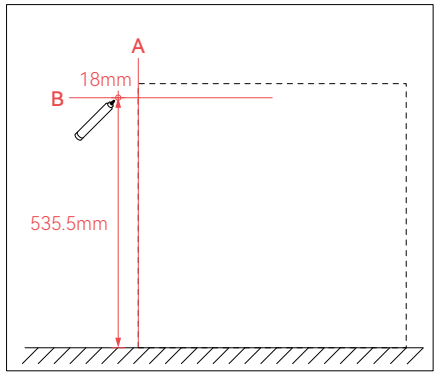
4.3 Installation

4.3.1 Location

Tools: spirit level, marker, tape meausre



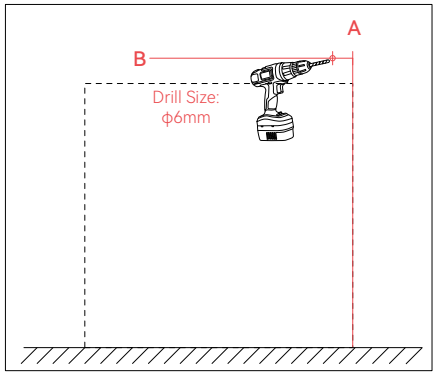
Select the left boundary of the chosen equipment and mark it. Fix the Y-axis of the level to the left side of the equipment and draw reference line A. The reference line should be perpendicular to the ground.



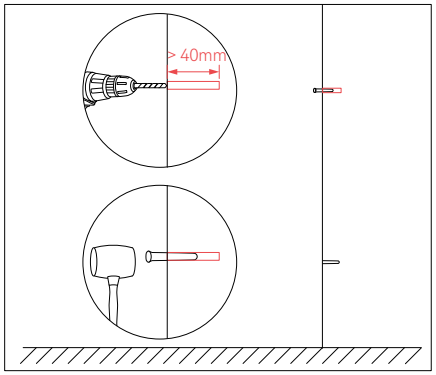
Perpendicular to reference line A, use a tape meausre and level to measure and draw reference line B. The distance between line B and the ground is 535.5mm. Starting from point A, mark the position of the inverter angle iron screw hole at 18mm on line B.

4.3.2 Drilling

Tools: electric drill (bit size: ϕ6mm), hammer, expansion tube (6x40mm) with screws.



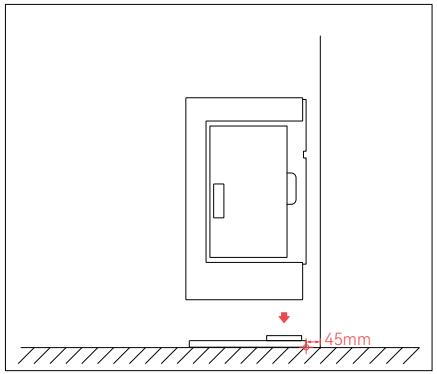
Use a ϕ6mm drill bit to drill holes at the marked positions.



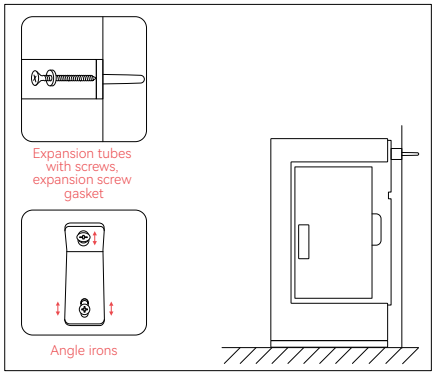
Hammer the expansion tubes into the holes.

4.3.3 Installation

Note: Please use the provided base for installation of the HM Series inverter.
Tools: Ruler, screwdriver, angle iron screws (M4x12mm), inverter angle iron, wall plugs and screws (6x40mm).
Standard Torque (Dry, Steel, Grade 8.8): 2.98 Nm



Mark the position at 45mm from the wall, place the base parallel to the wall (the waterproof sleeve for the connector is already installed on the base, do not remove it). Align the bottom connection port of the inverter with the anti-falling slot on the base and place it on the base.



Align the inverter angle iron with the right screw hole of the inverter and fix it with a screw. Do not overtighten the screw. Thread the expansion screw through the washer, fix the angle iron to the wall, and adjust the position of the angle iron screw. Tighten the screw.

4.3.4 Inspection

Check each of the previous steps one by one. Installation is complete.

5. Electrical Connection

5.1 Instructions before Wiring

5.1.1 Cable Requirements

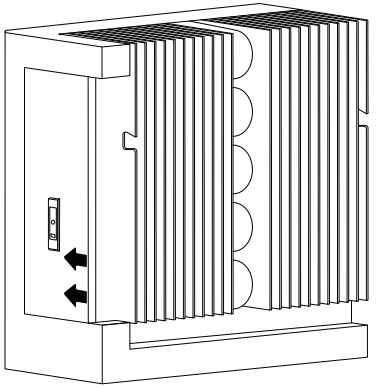
When using external wiring cables, the current and system overload capacity through the cables, as well as the ambient temperature, should be considered. The following table shows recommended cables. Engineers should refer to local standards and the following table when selecting cables. The cable length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

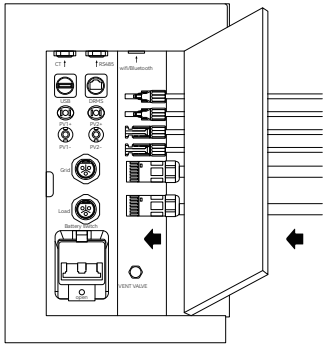
Category	Cable Size	Type of Circuit Breaker	RCD
Grid/ AC Input (L, N, PE)	6~10 mm²	230 V.a.c./40 A	30 mA/Type B
EPS/Load Output (L, N, PE)	6~10 mm²	230 V.a.c./32 A	30 mA/Type B
PV1/PV2/PV Input (+, -)	6 mm²	≥600 V.d.c./≥20 A	-

5.1.2 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 equipment. 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

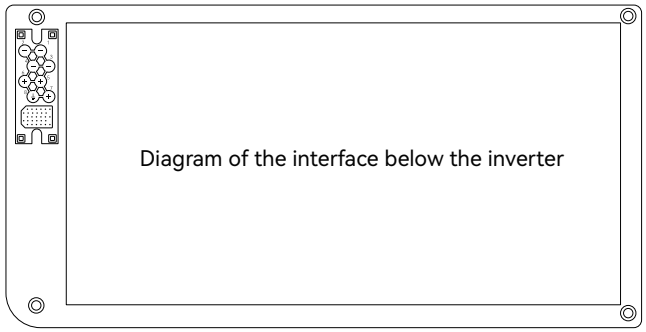
Before installation and use, use a wire (4-6 mm²) with lug as the ground wire.

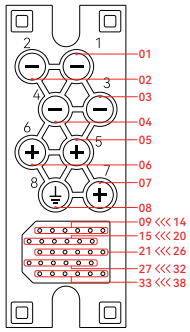
The capacity of the load output terminal of the equipment is as follows:
1. Inductive loads (e.g. air-conditioners, washing machines and motors): the individual maximum power is 2.2 KVA, and the total maximum power is 5 KVA.
2. Capacitive loads (e.g. computers and switching power supplies): the total maximum power is 5 KVA.

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.

5.1.3 Connection with Battery

This product can be connected to a battery. The battery terminals are located behind the inverter bottom / base cover. Unscrew the bottom cover to access to the battery terminals. The interface diagram and definitions for the bottom interface are as follows:





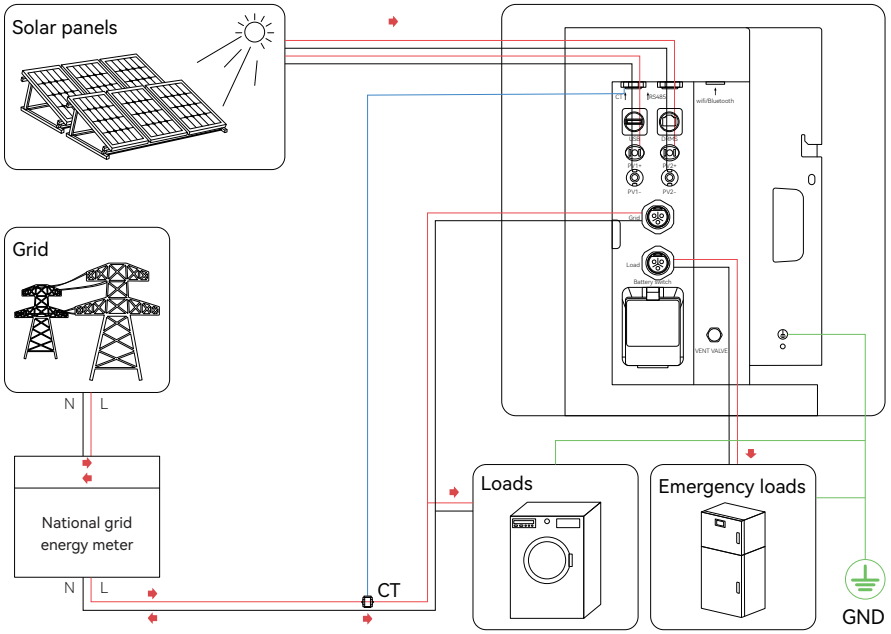
S/N	Mark	Purpose	S/N	Mark	Purpose
01	PACK-	Battery cathode	18	NC	Reserved interface
02	PACK-	Battery cathode	19	NC	Reserved interface
03	PACK-	Battery cathode	20	NC	Reserved interface
04	PACK-	Battery cathode	21	NC	Reserved interface
05	PACK+	Battery anode	22	NC	Reserved interface
06	PACK+	Battery anode	23	NC	Reserved interface
07	PACK+	Battery anode	24	NC	Reserved interface
08	Ground wire	Ground wire of the chassis	25	NC	Reserved interface
09	RS485-B2	Battery and inverter communication port	26	NC	Reserved interface
			27	NC	Reserved interface
10	RS485-A2	Battery and inverter communication port	28	NC	Reserved interface
			29	NC	Reserved interface
11	GND	Ground wire	30	NC	Reserved interface
12	GND	Ground wire	31	NC	Reserved interface
13	SW-air switch	Signal cable for enabling battery discharge	32	NC	Reserved interface
			33	NC	Reserved interface
14	SW-air switch	Signal cable for enabling battery discharge	34	NC	Reserved interface
			35	NC	Reserved interface
15	NC	Reserved interface	36	NC	Reserved interface
16	NC	Reserved interface	37	NC	Reserved interface
17	NC	Reserved interface	38	NC	Reserved interface

5.1.4 Temperature Sensing Device

During the operation of the inverter, temperature monitoring and control can be remotely conducted using the backend management system. When the inverter is stacked with a battery, the inverter can communicate with the battery's BMS through the communication port below the inverter, and read and control the battery temperature according to instructions from the backend management system.

NOTE This function requires the use of a Wi-Fi communication dongle (optional).

5.2 Schematic Diagram of System Connection

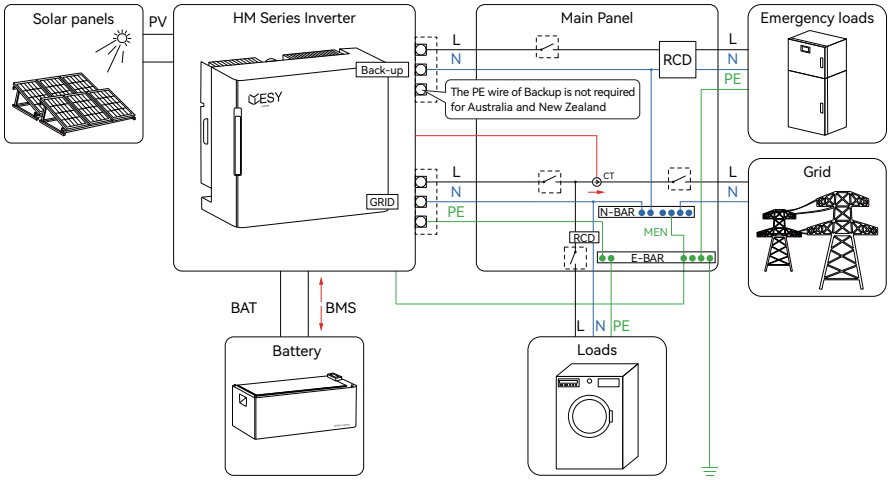


5.3 RCD Wiring Diagram

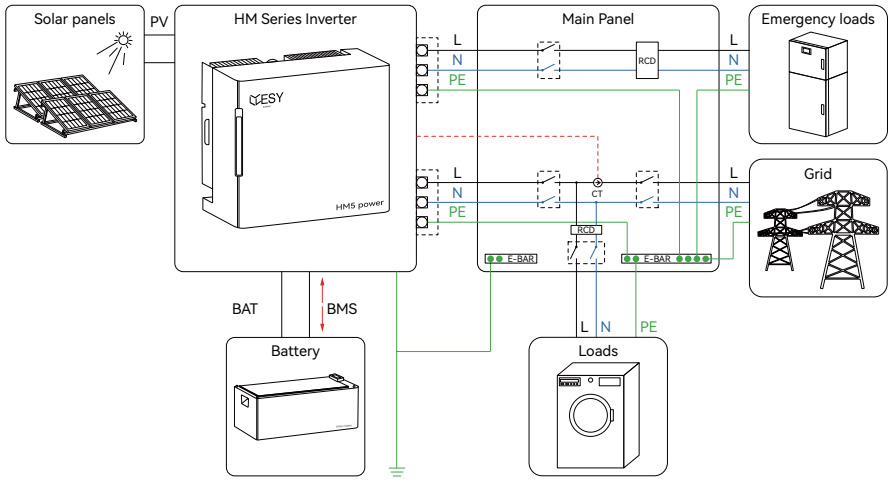
The following wiring diagram is applicable to Australia, New Zealand, South Africa, and other regions:

Warning

For Australia, New Zealand and South Africa, the neutral cable of ON-GRID side and BACK-UP side must be connected together. Otherwise BACK-UP function will not work.

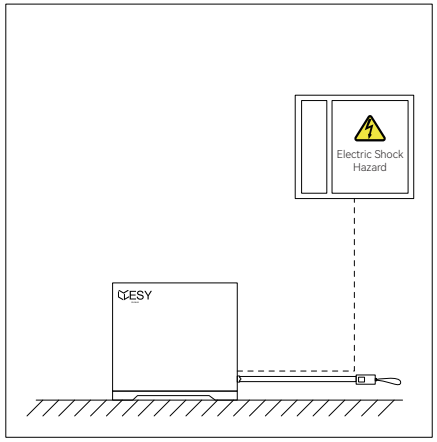


The following wiring diagram is applicable to regions other than Australia, New Zealand, and South Africa:

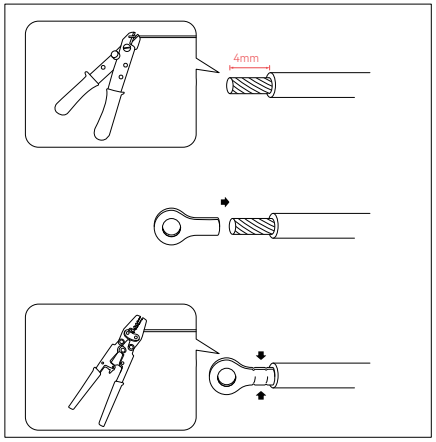


5.4 Ground Wire Connection

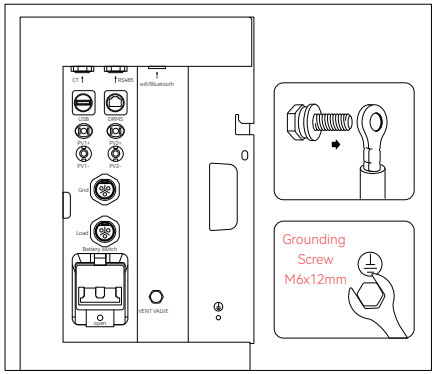
Tools: screwdriver, ground wire screw (ϕ 6mm), stripping pliers, crimp cable lug, crimping pliers, tape, ground wire
Standard Torque (Dry, Steel, Grade 8.8): 9.98 Nm



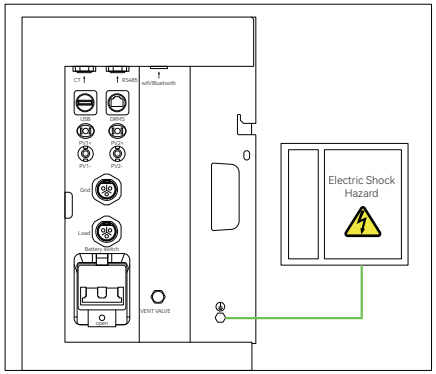
Measure the distance between the product and the power distribution box using the tape, and select a ground wire of appropriate length.



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 equipment 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.



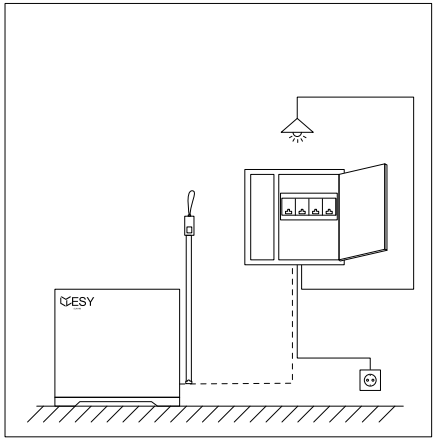
Ensure the ground wire is properly connected to ensure safety in installation and use.

Note

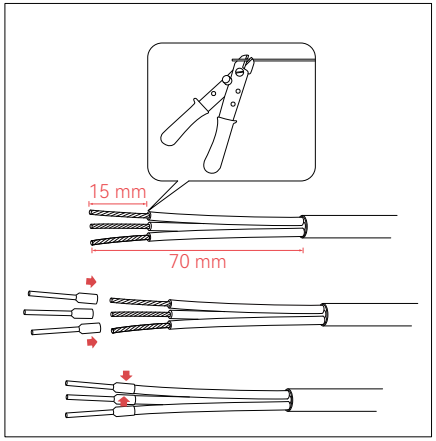
The inverter is neutral continuity maintained externally. Please ensure correct external grounding connection for the inverter. If the inverter shows a 'ground fault' after system installation, please check if the grounding is compliant with the requirements.

5.5 Load Connection

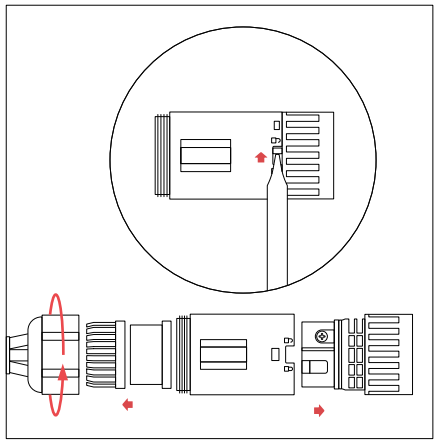
Tools: Screwdriver, cable terminal (single-phase three-wire), stripping pliers, tape, cable (L, N, PE)



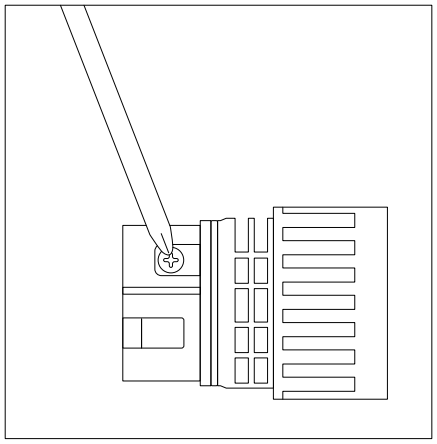
Measure the distance between the product and the power distribution box or load terminal using the tape, and select a cable of the appropriate length.



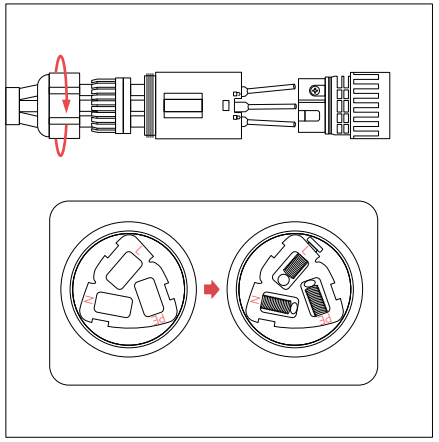
Strip the cable sheath by 70 mm and core insulation by 15 mm using the stripping pliers. (Note: Use ferrule crimping pliers to crimp an insulated cord end terminal 6 mm^2 onto the cable.)



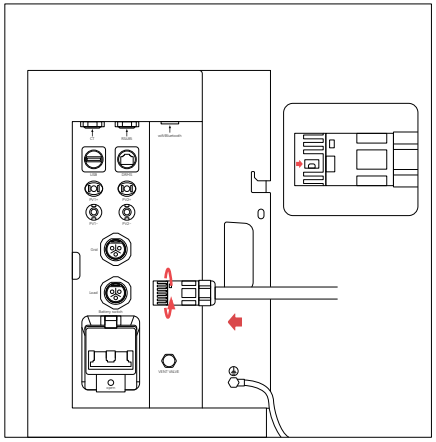
Twist the terminal at the back end, open the rear cover, and separate the waterproof rubber ring. Use a screwdriver to open the other end of the terminal's fuse, and then pull out the front end of the terminal.



Use the Phillips screwdriver to remove the screws from the front terminal.
Standard Torque: 0.8 Nm.



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.

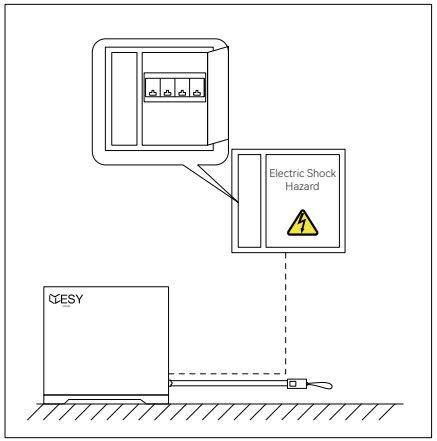
Warning!

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.

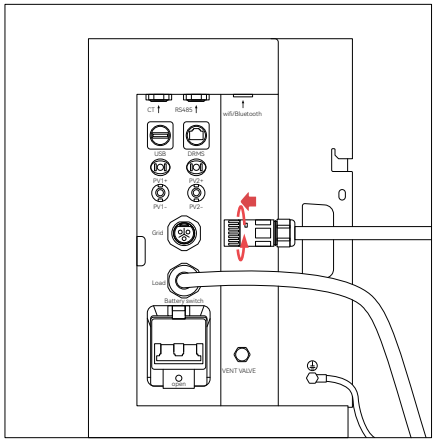
The HM Series inverter does not support parallel operation. Do not connect the load terminals in parallel.

5.6 Power Grid Connection

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



Turn off the circuit breaker of the power grid. Measure the distance to the power distribution box using the tape, and select a cable of appropriate length. Secure the terminal according to the load connection steps in 5.5.



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

Caution

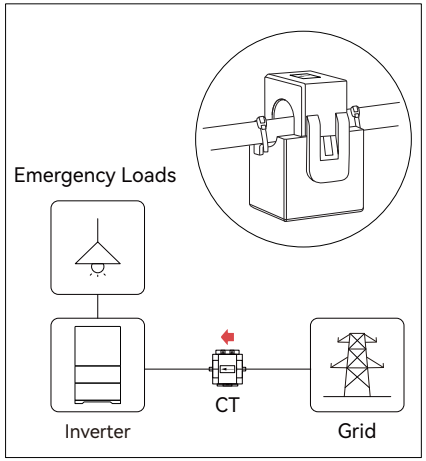
Make sure that the equipment is properly grounded before operation. Do not connect important backup loads to the Grid side whether the equipment is connected to the grid or not. Doing so may result in the equipment failing if the power grid is cut off.

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

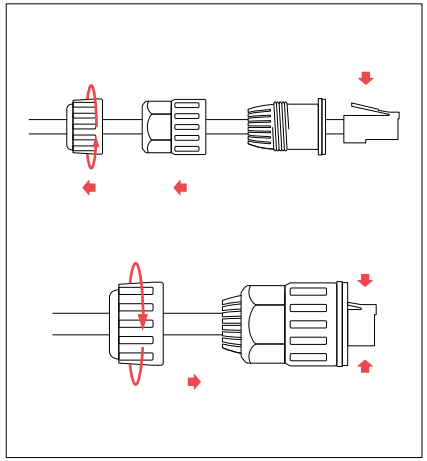
The grid voltage and frequency should be within the permissible range of the inverter.

The HM Series inverter is a single-phase inverter and cannot be used in combination with multiple inverters (AS/NZS).

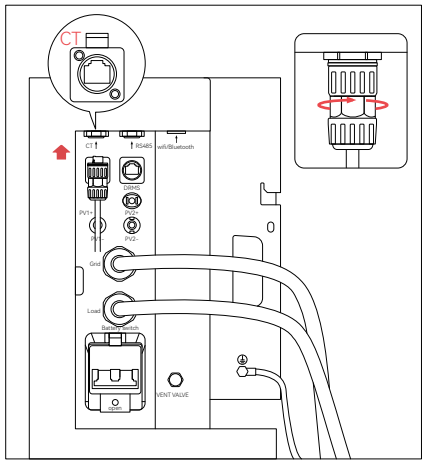
5.7 CT Installation Instruction



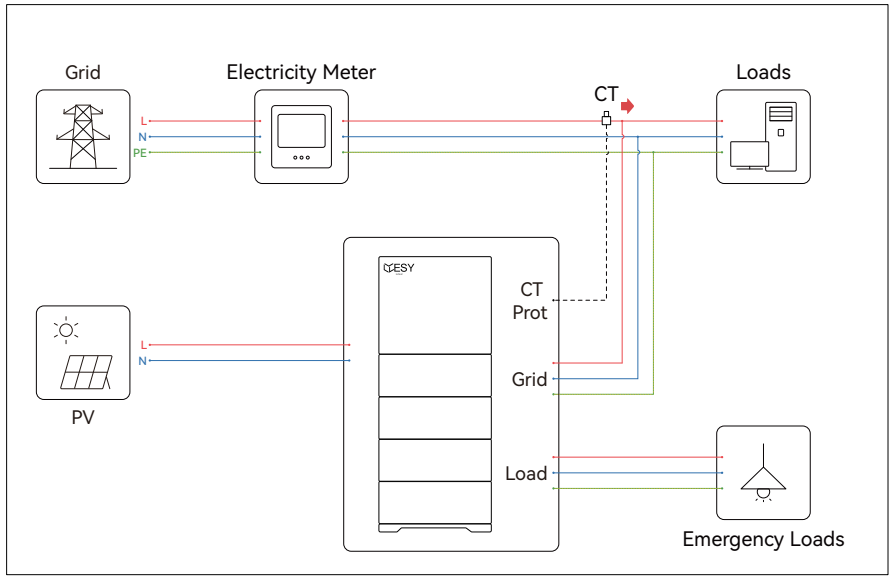
Place the CT on the grid side, with the arrow on the CT ("→") pointing towards the inverter and household loads.



Insert it into the waterproof rubber sleeve and push the rear terminal forward. Press the crystal head and tighten the end of the terminal.



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



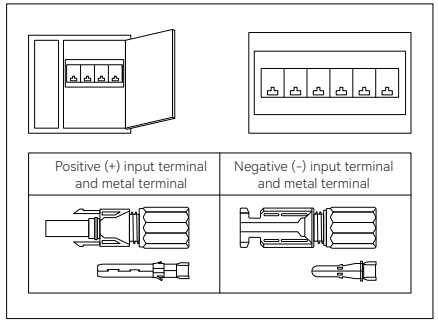
System Installation Diagram

5.8 PV Connection

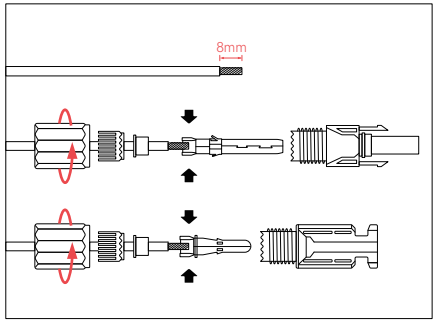
External DC isolators complied with AS 60947.3 are required to be installed for PV ports during the final installation as requested by Cl.7.3.4 from AS/NZS 4777.2.

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

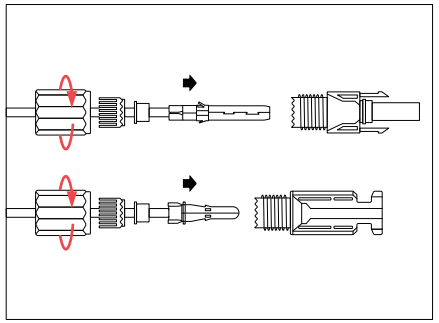
Before wiring, cover the shading plate and ensure that the photovoltaic components are within a safe voltage range.



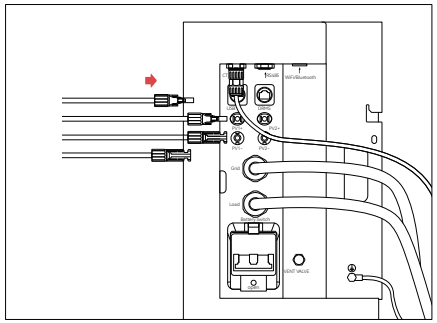
Disconnect all circuit breakers of the equipment and PV module. Make sure that the cables of the equipment and PV module are connected in a power-off condition. Check the external input terminal of the PV module for damage, and confirm its polarity.



Strip the DC cable insulation of the PV module by about 8mm 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 equipment and that of the machine. Connect the PV input cable to the equipment. Ensure the cables are connected properly.

Caution	
	Make sure that the maximum input voltage of the HM Series residential energy storage system does not exceed 550 V (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 500 V 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 equipment'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 1,000 V), and make sure that the open-circuit voltage does not exceed the specified value. When the ambient temperature is higher than 10 °C, 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.

5.9 Battery Connection

5.9.1 DC Connection Procedure for Battery Terminals

The ESYSUNHOME battery is designed for stacked installation beneath the inverter, eliminating the need for additional wiring. The inverter and battery terminals are aligned for direct connection. Follow the steps below for a proper connection:

1.Ensure Safety:

· Turn off the inverter and battery before making any connections.
· Verify that the battery and inverter are correctly positioned for stacking.

2.Battery Connector Preparation:

· Ensure the battery connector is clean and undamaged.
· Align the battery connector with the corresponding inverter port.

3.Connecting the Battery to the Inverter:

· Carefully stack the battery into place, ensuring the terminals align correctly.
· Secure the connection by firmly pressing the battery and inverter connectors together.
· Confirm that the connection is stable and fully engaged.

4.Final Checks:

· Check for any loose connections before operation.

5.9.2 Compatible Battery Types

This inverter is compatible only with ESYSUNHOME Lithium Iron Phosphate ($LiFePO_4$) batteries. Please refer to the ESYSUNHOME battery manufacturer's instructions for additional compatibility details.

5.9.3 Earth Fault Alarm (AS/NZS 5033 Compliance)

In accordance with AS/NZS 5033, the inverter is equipped with an earth fault detection system. If an earth fault occurs, the inverter will trigger an alarm to notify the user.

1.Alarm Indication:

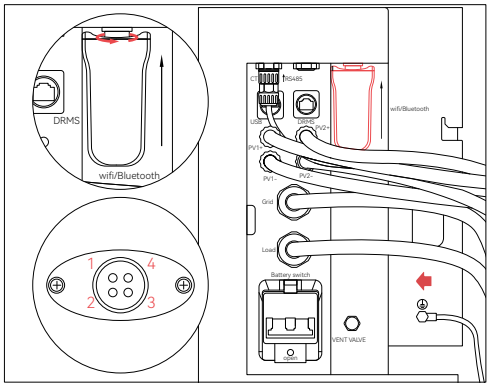
· The internal buzzer will beep.
· The fault indicator light will turn red.

2.User Notification:

· The fault details will be displayed on the monitoring app, prompting the electrician to check the system wiring.

5.10 Communication Interface

5.10.1 WiFi/Bluetooth Communication Interface (Optional)



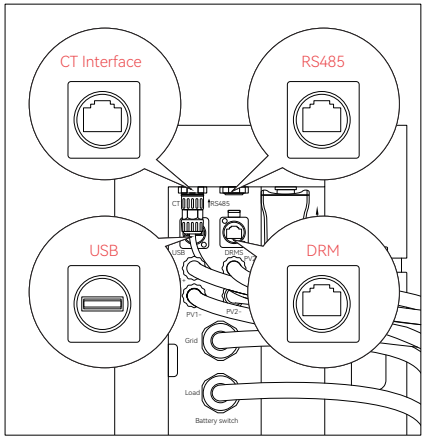
Pin definitions

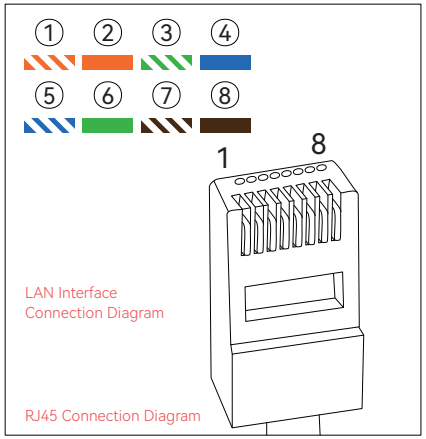
1 Inverter VCC
2 Ground wire GND
3 Data communication A
4 Data communication B

Connection

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

5.10.2 Interface Description

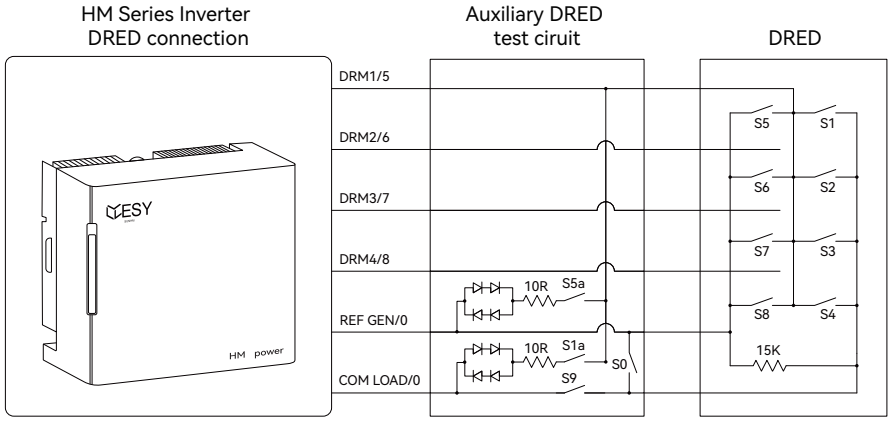




CT	(RJ45 Interface)	
Interface Description	Electricity meter connection.	
Pin Definitions	1: CT_N （red wire） 4: blue data communication CT_RS485- 8: CT_P （black wire） 5: blue-white data communication CT_RS485+	
RS485	(RJ45 Interface)	
Interface Description	Device Interface	
DRM	(RJ45 Interface)	
Interface 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	2: DRM2/6
	3: DRM3/7	4: DRM4/8
	5: REF GEN/0	6: COM LOAD/0
	7: Reserved V+	8: Reserved V-
USB	(USB Interface)	
Pin Definitions	Reserved communication interface for device maintenance	

5.10.3 DRM Mode Illustration

Illustration of the connection method between inverter DRM and DRED.



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 reactivepower 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 50% of rate power
DRM7	Do not generate at more than 75% of rate power and sink reactive power if capable
DRM8	Increase power generation (subject to constraints from other active DRMs)

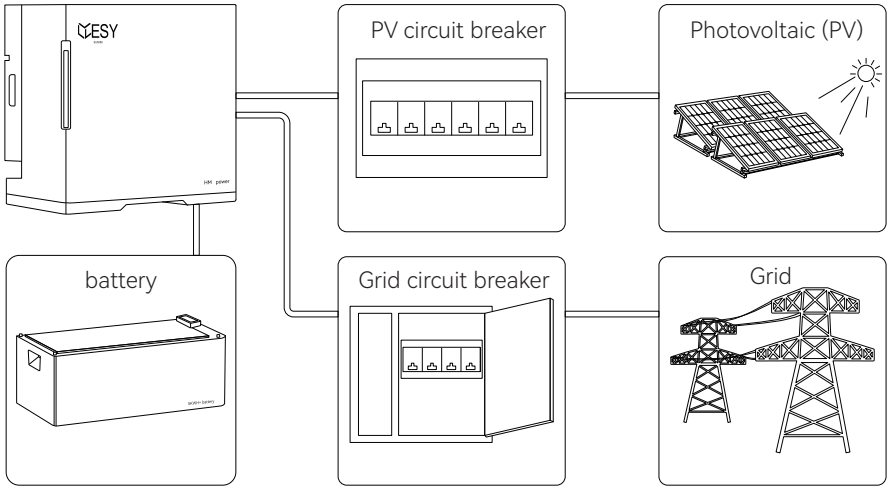
5.11 Power-on

Please follow the sequence below to switch the breakers for power-on check (the LED strip on the left side of the inverter will continuously flash and emit a buzzing sound, indicating that the inverter has started):

Grid: Switch the grid breaker to power on and start the device. At this time, you can use the APP for network configuration and check the system parameters. Network configuration methods are described in Chapter 6, Section 2.

Battery: In the case of using a battery, switch the battery breaker on the inverter to power on and start the device.

Photovoltaic: Switch the photovoltaic breaker to power on and start the device.



5.12 Switching Country Code

Factory default country code is set to Australia.
To switch, authorized personnel from the manufacturer or authorized personnel should use the upper computer or management platform to change the country code. Country code table.

Country	Grid-connection standard
DE	DIN VDE V 0124-100:2020, VDE-AR-N 4105:2018
IT	CEI 0-21
BE	C10/11:2021
AUS	AS4777.2

WARNING

Ensure to select the correct country code after system installation.
Consult the local electrical safety department when selecting the country code.

6. ESYSUNHOME APP

ESYSUNHOME APP features include: viewing inverter status and power generation data; real-time viewing and switching of inverter operation modes; scheduling inverter operation modes; turning on/off operations, etc.

User permission: End users of the inverter.

6.1 ESYSUNHOME APP

6.1.1 Download Address

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

iOS Android

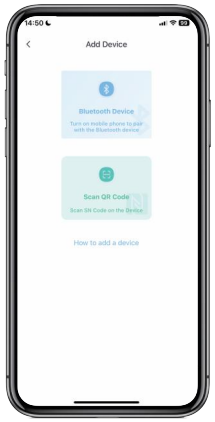
6.1.2 Registration and Installation

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.

6.2 Network Configuration

6.2.1 Install New Device

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



6.2.2 Add New Device

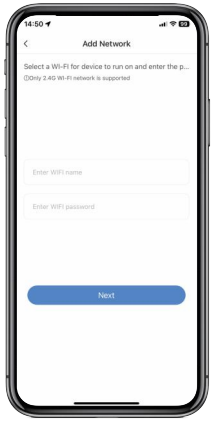
Open the APP, click “My Device” and “Add device”, and select Bluetooth or scan the SN code to pair the device.

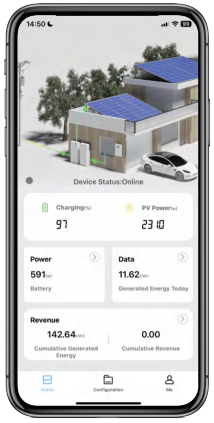
You can scan the QR code of WiFi-IOT Pro to get the SN code.

6.2.3 Device Network Configuration

Open the APP, log in to the account, click “Me” and configure the network for the device. The APP will request you to give Bluetooth permission. Once you have given the Bluetooth permission Click “ESYSUNHOME_ + SN code” and enter your WIFI name and password in the pop-up interface. Click “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.





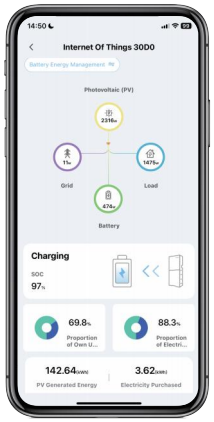
6.3 Data Monitoring

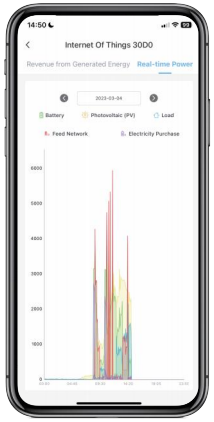
6.3.1 3D Scene Graph

After successful device linking, when entering the app homepage, you can see a 3D scene diagram containing the grid, load, and photovoltaic elements. The direction of the green cursor movement represents the direction of energy flow, allowing you to see the real-time status of the entire system in this diagram.

6.3.2 Energy Flow Diagram

Click 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.

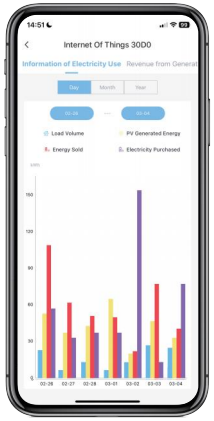




6.4 Data Statistics

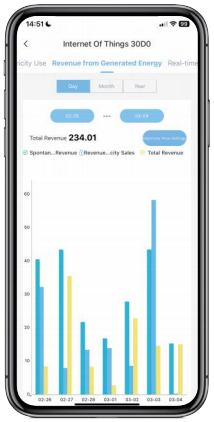
6.4.1 Real-time Power

Click "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.



6.4.2 Electricity Consumption Data

Click “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 clicking on the respective items.



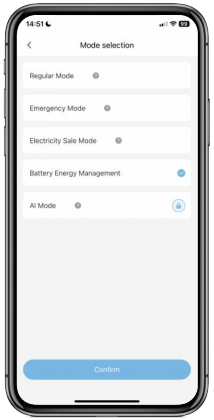
6.4.3 Revenue Data

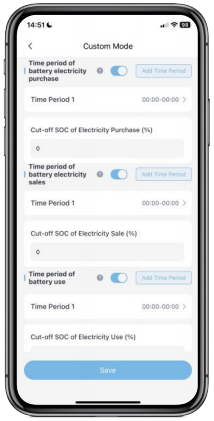
Click “Revenue” on the home page to enter the revenue display interface. In the statistical chart, you can view the daily, monthly, and yearly data, including the revenue of power generation, the revenue of sold electricity, and average revenue. Click the bar charts to see the details. Click the electricity 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.

6.5 Equipment Control

6.5.1 Mode Switching

Open the client APP, log in and enter the home page. Click 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 click it to enter the mode list and select an appropriate mode.





6.5.2 Batter Energy Management

Click 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.

6.5.3 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.

6.5.4 Inverter shutdown

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

6.6 Remote Monitoring

6.6.1 Alarm Information Monitoring

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

6.6.2 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.

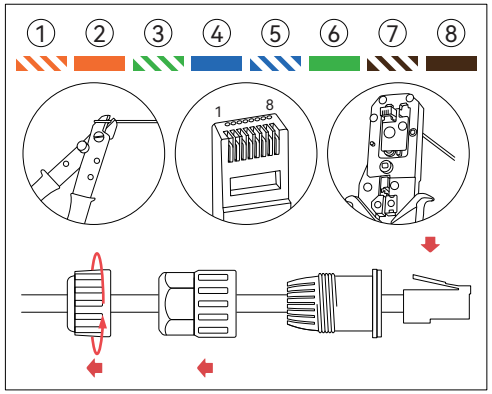
7. ESYSUNHOME Tool

ESYSUNHOME Tool is an upper computer software designed for HM Series inverter. It includes functions such as inverter parameter viewing, inverter settings modification, fault alarm viewing, battery parameter and status viewing, etc.

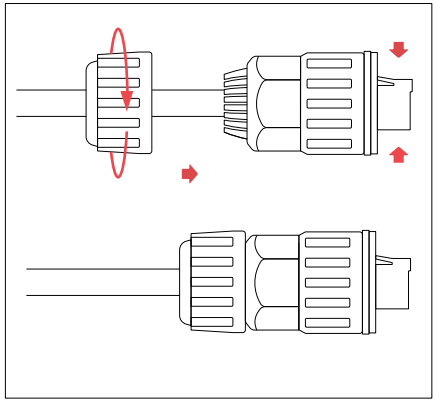
User permission: Inverter manufacturers or authorized maintenance personnel.

7.1 ESYSUNHOME Tool Connection

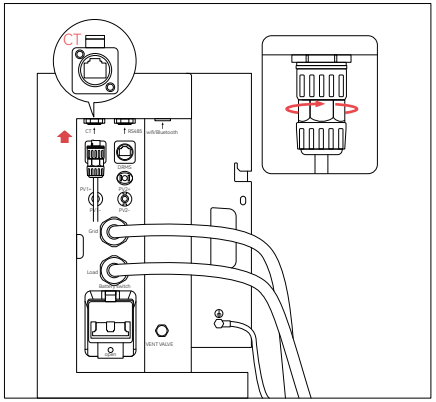
Tools: Screwdriver (small cross), Ethernet cable, Ethernet crimper, wire stripper, RS485 to USB connector.



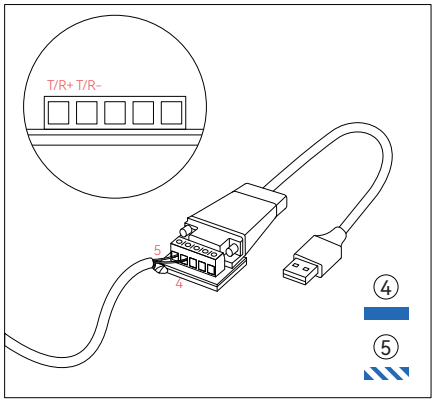
Use a wire stripper to separate the Ethernet cable and pass the wires through the corresponding parts in the sequence shown in the diagram. Press the wires into the crystal head in the order of colors 1 to 8 using an Ethernet crimper. After firmly securing the crystal head on the terminal, insert it into the terminal head.



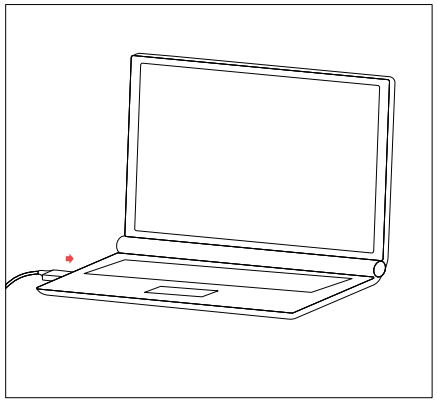
Tighten the end of the terminal and check if the connection is secure.



Connect the Ethernet cable with waterproof connectors to the RS485 interface on the inverter casing.

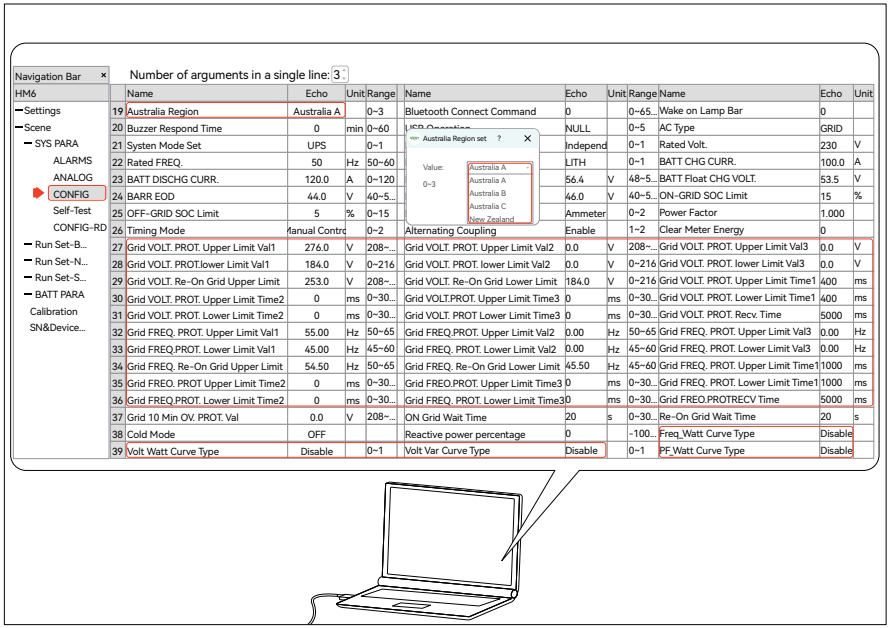


On the other end of the Ethernet cable, strip the insulation layer of wires 4 (blue) and 5 (blue-white) by 10 mm. Connect wire 4 (blue) to the B (T/R-) port of the RS485 TO USB connector, and connect wire 5 (blue-white) to the A (T/R+) port of the RS485 TO USB connector.



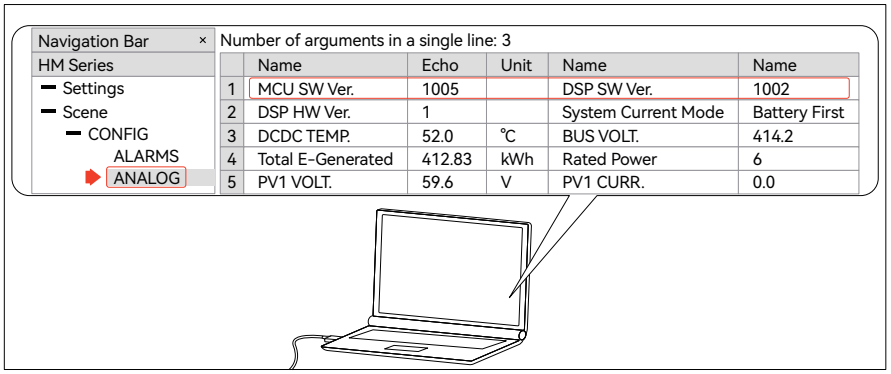
Connect the USB interface of the adapter to the computer. Use the ESYSUNHOME Tool software provided with the inverter to operate.

7.2 ESYSUNHOME Tool Functions



	Name	Echo	Unit	Range	Name	Echo	Unit	Range	Name	Echo	Unit
19	Australia Region	Australia A		0~3	Bluetooth Connect Command	0		0~65...	Wake on Lamp Bar	0	
20	Buzzer Respond Time	0	min	0~60	USB Operation	NULL		0~5	AC Type	GRID	
21	Systen Mode Set	UPS		0~1		Independ		0~1	Rated Volt.	230	V
22	Rated FREQ.	50	Hz	50~60		LITH		0~1	BATT CHG CURR.	100.0	A
23	BATT DISCHG CURR.	120.0	A	0~120		56.4	V	48~5...	BATT Float CHG VOLT.	53.5	V
24	BARR EOD	44.0	V	40~5...		46.0	V	40~5...	ON-GRID SOC Limit	15	%
25	OFF-GRID SOC Limit	5	%	0~15		Ammeter		0~2	Power Factor	1.000	
26	Timing Mode	Manual Contro		0~2	Alternating Coupling	Enable		1~2	Clear Meter Energy	0	
27	Grid VOLT. PROT. Upper Limit Val1	276.0	V	208~...	Grid VOLT. PROT. Upper Limit Val2	0.0	V	208~...	Grid VOLT. PROT. Upper Limit Val3	0.0	V
28	Grid VOLT. PROT.lower Limit Val1	184.0	V	0~216	Grid VOLT. PROT. lower Limit Val2	0.0	V	0~216	Grid VOLT. PROT. lower Limit Val3	0.0	V
29	Grid VOLT. Re-On Grid Upper Limit	253.0	V	208~...	Grid VOLT. Re-On Grid Lower Limit	184.0	V	0~216	Grid VOLT. PROT. Upper Limit Time1	400	ms
30	Grid VOLT. PROT. Upper Limit Time2	0	ms	0~30...	Grid VOLT.PROT. Upper Limit Time3	0	ms	0~30...	Grid VOLT. PROT. Lower Limit Time1	400	ms
31	Grid VOLT. PROT. Lower Limit Time2	0	ms	0~30...	Grid VOLT. PROT Lower Limit Time3	0	ms	0~30...	Grid VOLT. PROT. Recv. Time	5000	ms
32	Grid FREQ. PROT. Upper Limit Val1	55.00	Hz	50~65	Grid FREQ.PROT. Upper Limit Val2	0.00	Hz	50~65	Grid FREQ. PROT. Upper Limit Val3	0.00	Hz
33	Grid FREQ.PROT. Lower Limit Val1	45.00	Hz	45~60	Grid FREQ. PROT. Lower Limit Val2	0.00	Hz	45~60	Grid FREQ. PROT. Lower Limit Val3	0.00	Hz
34	Grid FREQ. Re-On Grid Upper Limit	54.50	Hz	50~65	Grid FREQ. Re-On Grid Lower Limit	45.50	Hz	45~60	Grid FREQ. PROT. Upper Limit Time1	1000	ms
35	Grid FREQ. PROT Upper Limit Time2	0	ms	0~30...	Grid FREQ.PROT. Upper Limit Time3	0	ms	0~30...	Grid FREQ. PROT. Lower Limit Time1	1000	ms
36	Grid FREQ.PROT. Lower Limit Time2	0	ms	0~30...	Grid FREQ. PROT. Lower Limit Time3	0	ms	0~30...	Grid FREQ.PROTRECV Time	5000	ms
37	Grid 10 Min OV. PROT. Val	0.0	V	208~...	ON Grid Wait Time	20	s	0~30...	Re-On Grid Wait Time	20	s
38	Cold Mode	OFF			Reactive power percentage	0		-100...	Freq_Watt Curve Type	Disable	
39	Volt Watt Curve Type	Disable		0~1	Volt Var Curve Type	Disable		0~1	PF_Watt Curve Type	Disable	

On the CONFIG page of the upper computer software, modify the value of "Australia Region" and select Australia Region A,B,C for power quality response modes.



View Firmware Version: On the ANALOG page of the upper computer, check the MCU SW Ver. and DSP SW Ver. to obtain Firmware Version information.

User permissions: only inverter manufacturers or authorized maintenance personnel can access ESYSUNHOME Tool to view or modify the setting parameters.

Country Code: On the ANALOG page of the upper computer, check the country code to obtain country code information.

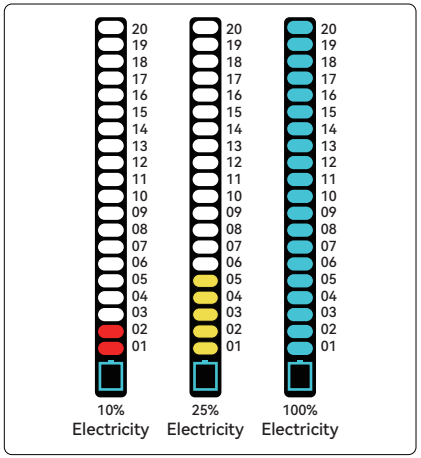
Generation Limit Control: On the CONFIG page of the upper computer software, modify the value of Max Output Power Percent to be (Generation limit/6000W) %.

Export Limit Control: On the CONFIG page of the upper computer software, set ON-OFF Grid Mode to ANTI, then modify the value of Backflow Prevent Power Percent to be (Export limit/6000W) %.

NOTE

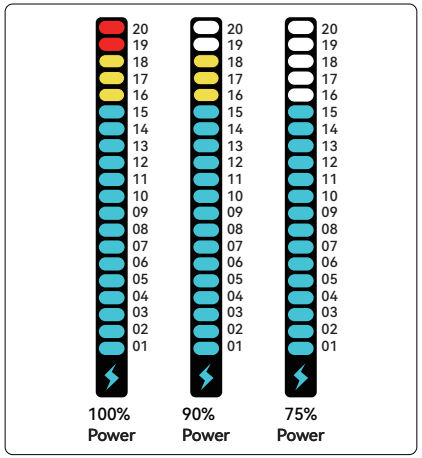
Inverter has generation/export control capabilities but are not tested to AS/NZS 4777.2:2020.

8. Light Bar Indication



8.1 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.



8.2 Power Status

The symbol " ϟ " 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.

8.3 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	20 19 18	Troubleshooting
2	Major	Silent	Top two red indicators ON	20 19 18	Troubleshooting
3	Minor	Silent	Top three yellow indicators ON	20 19 18	60 s
4	Upgrading	Silent	Top three blue indicators ON	20 19 18	Upgrade Completed

9. System Maintenance

9.1 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.

9.2 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.

9.3 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.

10. After-sales Service

Service email: support@esysunhome.com
Or, contact the local installer.