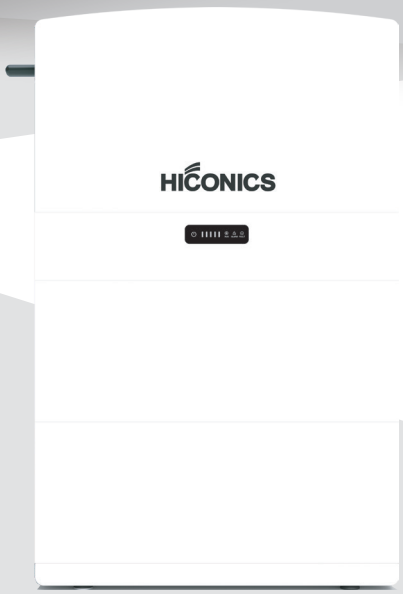
HICONICS
Midea Industrial Tech.

HEC2 SINGLE PHASE RESS USER MANUAL



EXCLUSION OF LIABILITY

All names, trademarks, product names or other designations used in this manual may be legally protected even if not indicated as such (e.g. as a trademark). **HICONICS ECO-ENERGY DRIVE TECHNOLOGY CO., LTD.** assumes no liability or warranty for their free usage. The illustrations and texts have been compiled with great care. However, the possibility of errors cannot be ruled out. The compilation is made without any guarantee.

GENERAL NOTE ON GENDER EQUALITY

HICONICS ECO-ENERGY DRIVE TECHNOLOGY CO., LTD. is aware of the importance of language with regard to the equality of women and men and always makes an effort to reflect this in the documentation. Nevertheless, for the sake of readability we are unable to use non-gender-specific terms throughout and use the masculine form instead.

CONTENTS

1 Notes on this Manual

1.1Scope of Validity

This manual is an integral part of HEC2 series hybrid single phase residential storage system, it describes the assembly, installation, commissioning, maintenance and failure of the product. Please read it carefully before operating.

Configuration	
Inverter	ESS
HEC2-S3.8Hr2	HEC2-BHP50r2
HEC2-S5.0Hr2	HEC2-BHP100r2
HEC2-S6.0Hr2	HEC2-BHP150r2

Inverter naming rules, for example: HEC2-S 5.0B10

"HEC2" means "HICONICS 2rd HESS product series".

"S" means "Single Phase Output".

"5.0" means "output power "5kW".

"H" means "High voltage".

"r2" means "All-in-one".

ESS naming rules, for example: HEC2-BHP50r2

"HEC2" means "HICONICS 2rd HESS product series".

"B" means "Battery system"

"H" means "High voltage battery system"

"P50" means "5kWh"

"r2" means "all in one system"

Store this manual where it will be accessible at all times.

1.2 Target Group

This manual is for qualified electricians. The tasks described in this manual only can be performed by qualified electricians.

1.3 Symbols Used

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

 **Danger!**	Extremely dangerous situation leading to certain death or serious injury if the safety information is not observed.
 **Warning!**	Dangerous situation leading to potential death or serious injury if the safety information is not observed.
 **Caution**	Dangerous situation leading to potential injury if the safety information is not observed.
 **Notice**	Indicates actions that may cause material damage.

1.4 EU declarations of conformity

HICONICS ECO-ENERGY DRIVE TECHNOLOGY CO., LTD. hereby declares that the inverter described in this document complies with the basic requirements and other relevant conditions of the directives listed below.

Directive 2014/30/EU

(on the approximation of the laws of the Member States relating to electromagnetic compatibility(EMC))

Directive 2014/35/EU

(on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits – in short: Low Voltage

Directive)

Directive 2011/65/EU (RoHS)
on the restriction of the use of certain hazardous substances in electrical and electronic equipment You will find a detailed EU Declaration of Conformity in the download area at: www.hiconics-global.com

2 Safety

2.1 Notes on this Manual Explanation of Symbol

This section gives an explanation of all the symbols shown on the inverter and on the type label.

Symbol	Explanation
	CE mark. The inverter complies with the requirements of the applicable CE
	TUV mark
	Beware of hot surface. The inverter can become hot during operation. Avoid contact during operation. Danger of high voltages.
	Danger to life due to high voltages in the inverter!
	Danger Risk of electric shock!
	Observe enclosed documentation
	The system can't be disposed together with the household waste. Disposal information can be found in the enclosed documentation.
	Do not operate this equipment until it is isolated from battery, grid and on-site PV generation suppliers.

Danger to life due to high voltage.
There is residual voltage existing in the inverter after powering off.
Which needs 5 min to discharge.
Wait 5 min before you open the upper lid or the DC lid.

2.2 Important Safety Instructions

Danger!

Danger!
Danger to life due to high voltages in the inverter! All work must be carried out by qualified electrician
The appliance is not to be used by children or persons with reduced physical sensory or
mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.

Caution

Caution!
Possible damage to health as result of the radiation!
Do not stay closer than 20cm to inverter for any length of time.

Notice

Notice!
Grounding the PV generator.
Comply with the local requirements for grounding the PV modules and the PV generator. It is recommends connecting the generator frame and other electrically conductive surfaces in a manner which ensures continuous conduction and ground these in order to have optimal protection of system and persons.

Warning!

Warning!
Ensure input DC voltage ≤Max. DC voltage .Over voltage may cause permanent damage to inverter or other losses, which will not be included in warranty!

Warning!

Warning!
Risk of electric shock!

Warning!

Warning!
Authorized service personnel must disconnect both AC and DC power from inverter before attempting any maintenance or cleaning or working on any circuits connected to inverter.

Warning!

Warning!
Do not operate the inverter when the device is running.

- Prior to the application, please read this section carefully to ensure correct and safe application. Please keep the user manual properly.
- Accessories only together with the inverter shipment are recommend here .other- wise may result in a risk of fire, electric shock, or injury to person.
- Make sure that existing wiring is in good condition and that wire is not undersized.
- Do not disassemble any parts of inverter which are not mentioned in installation guide. It contains no user-serviceable parts. See Warranty for instructions on obtaining service. Attempting to service the inverter yourself may result in a risk of electric shock or fire and will void your warranty.
- Keep away from flammable, explosive materials to avoid fire disaster.
- The installation place should be away from humid or corrosive substance.
- Authorized service personnel must use insulated tools when installing or working with this equipment.

- PV modules shall have an IEC 61730 class A rating.
- Never touch either the positive or negative pole of PV connecting device. Strictly prohibit touching both of them at the same time.
- The unit contains capacitors that remain charged to a potentially lethal voltage after the MAINS, battery and PV supply has been disconnected.
- Hazardous voltage will present for up to 5 minutes after disconnection from power supply
- CAUTION-RISK of electric shock from energy stored in capacitor, never operate on the inverter couplers, the MAINS cables, Battery cables, PV cables or the PV generator when power is applied. After switching off the PV , battery and Mains, always wait for 5minutes to let the intermediate circuit capacitors discharge before unplug DC ,battery plug and MAINS couplers.
- When accessing the internal circuit of inverter, it is very important to wait 5 minutes before operating the power circuit or demounting the electrolyte capacitors inside the device. Do not open the device beforehand since the capacitors require time sufficiently discharge!
- Measure the voltage between terminals DC+ and DC- with a multi-meter (impedance at least 1Mohm) to ensure that the device is discharged before beginning work (35VDC) inside the device.
- Testing to AS/NZS 4777.2:2020 to multiple inverter combinations has not been conducted. So multiple phase inverter combinations should not be used or external devices should be used in accordance with the requirements of AS/NZS 4777.1.

Surge protection devices (SPDs) for PV installation

Warning!

Warning!

Over-voltage protection with surge arresters should be provided when the PV power system is installed.

The grid connected inverter is not fitted with SPDs in both PV input side and MAINS side.

- Lightning will cause a damage either from a direct strike or from surges due to a nearby strike.
- Induced surges are the most likely cause of lightning damage in majority or installations, especially in rural areas where electricity is usually provided by long overhead lines. Surge may be included on both the PV array conduction and the AC cables leading to the building.
- Specialists in lightning protection should be consulted during the end use application.
- Using appropriate external lightning protection, the effect of a direct lightning strike into a building can be mitigated in a controlled way, and the lightning current can be discharged into the ground.
- Installation of SPDs to protect the inverter against mechanical damage and excessive stress include a surge arrester in case of a building with external lightning protection system (LPS) when separation distance is kept.
- To protect the DC system, surge suppression device (SPD type2) should be fitted at the inverter end of the DC cabling and at the array located between the inverter and the PV generator, if the voltage protection level (VP) of the surge arresters is greater than 1100V, an additional SPD type 3 required for surge protection for electrical devices.
- To protect the AC system, surge suppression devices (SPD type2) should be fitted at the main incoming point of AC supply (at the consumer 's cutout), located between the inverter and the meter/distribution system; SPD (test impulse D1) for signal in according l to EN 61632-1.
- All DC cables should be installed to provide as short a run as possible, and positive and negative cables of the string or main DC supply should be bundled together. Avoiding the creation of loops in the system.

- Spark gap devices are not suitable to be used in DC circuits once conducting, they won't stop conducting until the voltage across their terminals is typically more than 30 volts.

Anti-Islanding Effect

- Islanding effect is a special phenomenon that grid-connected PV system still supply power to the nearby grid when the voltage loss is happened in the power system. It is dangerous for maintenance personnel and the public. HiEnergy series inverter provide Active Frequency Drift(AFD) to prevent islanding effect.

PE Connection and Leakage Current

- The end-use application shall monitor the protective conductor by residual current operated protective device (RCD) with rated fault current Ifn≤240mA which automatically disconnects the device in case of a fault.
  The device is intended to connect to a PV generator with a capacitance limit of about 700nf.

Warning!

Warning!
High leakage current!
Earth connection essential before connecting supply.

- Incorrect grounding can cause physical injury, death or equipment malfunction and increase electromagnetic.
- Make sure that grounding conductor is adequately sized as required by safety regulations.
- Do not connect the ground terminals of the unit in series in case of a multiple installation. This product can cause current with a DC component, Where a residual current operated protective (RCD) or monitoring (RCM) device is used for protection
  in case of direct or indirect contact, only an RCD or RCM of type B is allowed on the supply side of this product.

For United Kingdom

- The installation that connects the equipment to the supply terminals shall comply with the requirements of BS 7671.
- No protection settings can be altered.
- User shall ensure that equipment is so installed, designed and operated to maintain at all times compliance with the requirements of ESQCR22(1)(a).

For Australia and New Zealand

- Electrical installation and maintenance shall be conducted by licensed electrician and shall comply with Australia National Wiring Rules.

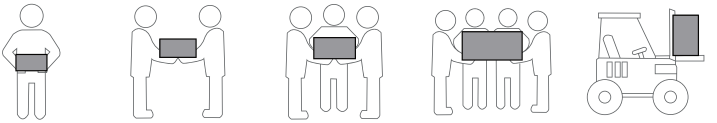
Battery Safety Instructions

- HiEnergy Series inverter should be worked with high voltage battery, for the specific parameters such as battery type, nominal voltage and nominal capacity etc., please refer to the parameters list.
- As accumulator batteries may contain potential electric shock and short-circuit current danger, to avoid accidents that might be thus resulted, the following warnings should be observed during battery replacement:

1:Do not wear watches, rings or similar metallic items.
2: Use insulated tools.
3: Put on rubber shoes and gloves.
4: Do not place metallic tools and similar metallic parts on the batteries.
5: Switch off load connected to the batteries before dismantling battery connection terminals.
6: Only personal with proper expertise can carry out the maintenance of accumulator batteries.

2.3 Handle heavy loads safely

- When carrying heavy objects, you should be prepared to bear the weight to avoid being crushed or sprained by heavy objects.



< 18 kg (< 40 lbs) | *18-32 kg (40-70 lbs)* | *32-55 kg (70-12 lbs)* | *55-68 kg (121-150 lbs)* | *> 68 kg (> 150 lbs)*

- When multiple people carry heavy objects at the same time, it is necessary to consider the height and other conditions, and do a reasonable job of personnel matching and division of labor to ensure a balanced weight distribution.
- When two or more people are carrying heavy loads together, one person should direct the equipment and lift or lower the equipment at the same time to ensure a uniform pace.
- When handling equipment by hand, you should wear protective gloves, labor protection shoes and other safety protective equipment to avoid injury.
- When carrying the equipment by hand, first approach the object, squat down, use the force of straightening your legs, do not use the strength of your back, slowly and steadily lift the object, and it is strictly forbidden to suddenly jerk or twist the torso.
- Do not quickly lift heavy objects to waist height, but place them on a half-waist high workbench or an appropriate place, adjust the position of your palms, and then lift them.
- Carrying heavy objects must be balanced and stable; The speed of movement should be uniform and low; Positioning is required to be smooth and slow, so as to avoid any impact or drop that scratches the surface of the equipment or damages the components and cables of the equipment.

3 Introduction

3.1 Basic features

HiEnergy Series is a high-quality system which can convert solar energy to AC energy equipped with storage battery.It's an all-in-one system. HiEnergy inverter is only compatible with HiEnergy batteries (HEC2-BHP) and currently is not compatible withother batteries (include other LFPbattery and Lead acid battery)

The HiEnergy Series system can be used to optimize self-consumption, store in the battery for future use or feed in to public grid. Work mode depends on PV energy and user's preference. It can provide power for emergency use during the grid lost by using the energy from battery and inverter generated from PV.

System Diagram

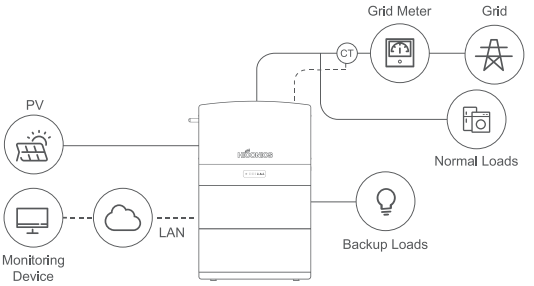


Figure1 *DC-coupled Storage System – Scheme*

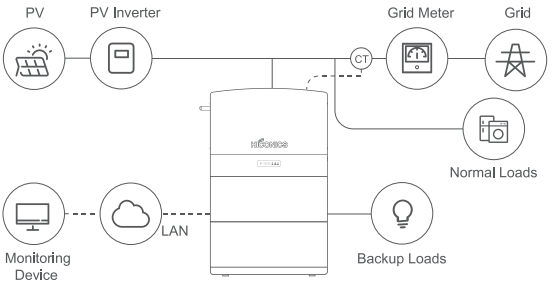


Figure 2 *AC-coupled Storage System – Scheme*

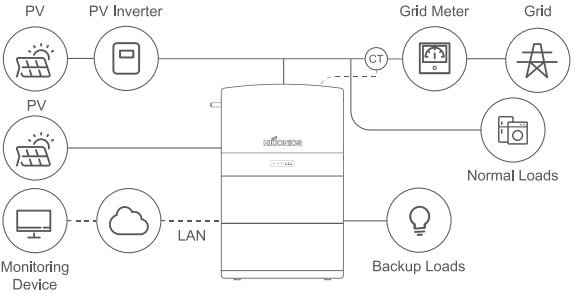


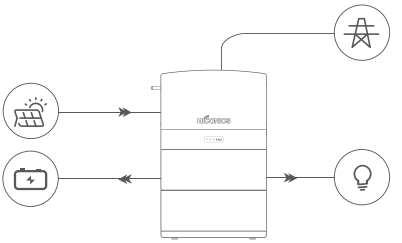
Figure 3 *Hybrid-coupled Storage System – Scheme*

3.2 Work Modes

There are three basic modes that end users can choose via inverter APP.

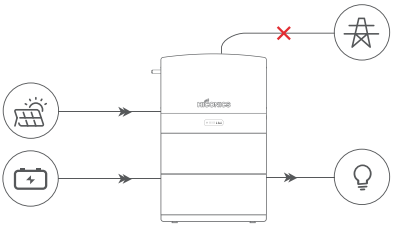
• SELF CONSUMPTION:

The energy generated by the solar panels will be used in the following order: Feed the home loads; Charge the battery and then, feed into the grid. When the sun is off, the load will be supported by battery to enhance self consumption. If the power supply from the batteries is not sufficient, the grid will support the load demand.



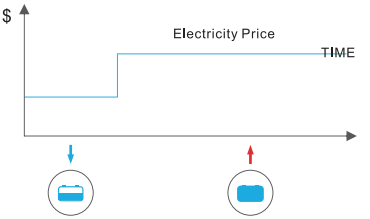
• BAT PRIORITY:

Under this mode, the battery is only used as a backup power supply when the grid fails and as long as the grid works, the batteries won't be used to power the loads. The battery will get charged with the power generated by the PV system or from the grid.



•PEAK SHIFT

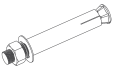
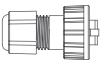
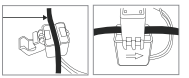
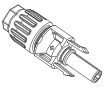
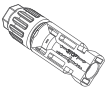
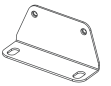
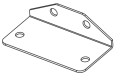
This mode is designed for time-use mode customer. The customer is able to set up the charging/discharging time & power via inverter screen or APP.

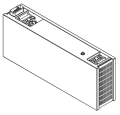
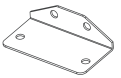
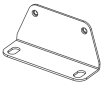
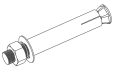


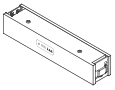
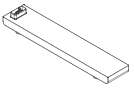
3.3 Packing list

Check the following parts list to ensure it is complete.

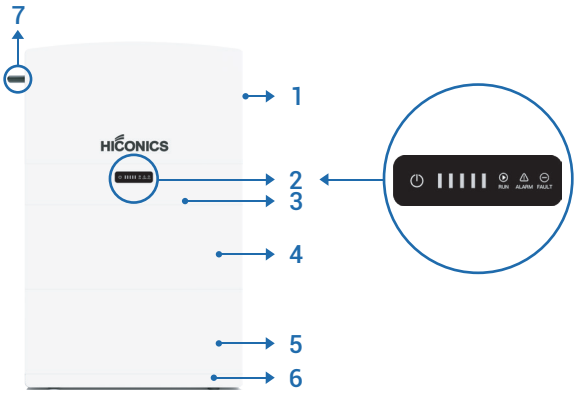
Delivers a total system separately on site to client, this consists of:

Inverter packing list				
				
1x Hybrid inverter	4xM6*12	12xM8*50	4x RJ45 cable end	1xCT and com cable
				
2x PV positive terminal	2x PV negative terminal	1x Grid male connector	1x Load female connector	4x Battery bracket
				
2x Inverter bracket	4x battery mounting panel	Connecting wiring harness	WI-FI dongle	

2x Battery packing list				
				
battery pack	2 PCS	2 PCS	M 5 *14 （8 PCS）	M 8 *60(4 PCS)

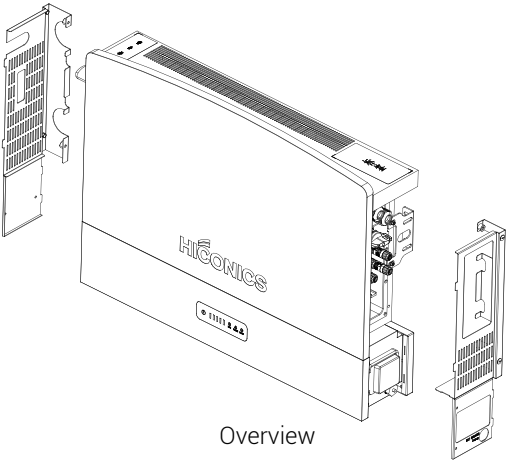
Control box & base				
				
1xBMS control box	1x base			

3.4 System Appearance

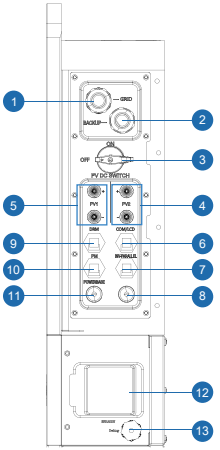


HEC2-S Series	
1	Hybrid Inverter
2	LED Display Screen
3	BMS control box
4	Battery pack
5	Battery pack (Battery 2, if configured, Max. 3 packs)
6	Base
7	WIFI interface

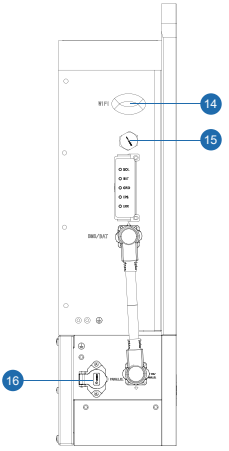
3.5 Wiring port part



Overview



Right side



Left side

1. Grid
2. Backup
3. DC Switch(PV)
4. PV1
5. PV2
6. COM/LCD
7. INV-PARALLEL
8. COM1
9. DRM
10. PM
11. COM2
12. Battery breaker
13. Debug
14. PCS WIFI interface
15. Pressure relief valve
16. Battery connectors

PCS WIFI interface: The WIFI port of the PCS is a port to upgrade and monitor the PCS or system through the cloud

Battery WIFI interface: The WIFI port of the BMS control box is used to upload battery -related information to the cloud for data monitoring when the PACK is sold separately

PARALLEL: Parallel port of PCS is used for PCS parallelization, this interface is used to transmit current, phase and other information required for parallelization, the function has not been developed yet, this port has no function.

Battery connectors: The PARALLEL port of the BMS control box is used to connect two battery clusters in parallel and to transmit power and communication signals.

Power button: Pressing this button is used to wake up the battery after it has been depleted to the point of power-down protection.

3.6 LED lights display define

3.6.1 Battery system LED display define

Table1 LED function display

State	Discription	RUN	ALM	FAU	Battery SOC indicator					Discription
System power off	Power off	off	off	off	off	off	off	off	off	off
System standby	Normal	Blinking1	off	off	Based on real SOC power indication					Standby mode
	Warning	Blinking1	Blinking2	off						Battery pack low voltage/low SOC/ low temperature
	Fault	Blinking1	off	Blinking3						Communication/ equipment damage
Charging mode	Normal	On	off	off	Based on real SOC power indication					
	Warning	On	Blinking2	off	All the LED blinking 2					When the battery fully charged, all the SOC LED blingking 2;When overcharge warning, Alarm LED blingking 2.
	Overcharge protection	On	off	off	On	On	On	On	On	After activating the overcharge protection for a period of time, if there is no charging current input,then it transitions to standby mode.
	Over current protection	Off	Blinking1	Blinking1	Off	Off	Off	Off	Off	Stop charging
	Voltage difference protection	Off	Blinking1	Blinking1						If the voltage difference of the battery cell exceeds the allowable value,start the protection and stop charging
	Communication fault	Off	Blinking1	Blinking3						BMS internal and PCS communication failure, start protection, stop charging
	Tempera-ture fault	Off	Blinking2	Blinking2						If the NTC temperature difference/rise exceeds the allowable value, start protection and stop charging
	Normal	On	Off	Off	Based on real SOC power indication					Discharging normally

Discharging mode	Low SOC warning	On	Blinking2	Off	Blinking2	Off	Off	Off	Off	If the battery level is lower than the set SOC value, an alarm will be triggered, and the minimum battery level LED will flash to stop discharging
	Over current protection	Off	Blinking1	Blinking1	Off	Off	Off	Off	Off	Stop discharginh
	Voltage difference protection	Off	Blinking1	Blinking2						If the voltage difference of the battery cell exceeds the allowable value, start the protection and stop discharging
	Communication fault	Off	Blinking1	Blinking3						BMS internal and PCS communication failure, start protection, stop discharging
	Temperature fault	Off	Blinking2	Blinking2						If the NTC temperature difference/rise exceeds the allowable value, start protection and stop discharging
Fault	Equiptment fault	Off	Off	On	Off	Off	Off	Off	Off	Stop charging and discharging

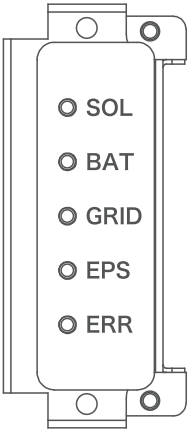
Table 2 Instructions for the Operation of the Power LED

State		Charge mode					Discharge mode				
SOC LED lights		L1	L2	L3	L4	L5	L1	L2	L3	L4	L5
		●	●	●	●	●	●	●	●	●	●
SOC	0~20%	Blinking2		Off	Off	Off	Blinking2	On	On	On	On
	20%~40%	One by one light up		Off	Off	Off	On	Blinking2	Off	Off	Off
	40%~60%	One by one light up			Off	Off	On	On	Blinking2	Off	Off
	60%~80%	One by one light up				Off	On	On	On	Blinking2	Off
	80%~100%	One by one light up					On	On	On	On	Blinking2
	Over charge protection	On	On	On	On	On	On	On	On	On	On
Battery running indicator light		Normal ●					Blinking（Blinking2）				

Table 3 Explanation of LED working indicator flashing

Type	On	Off
Blinking1	0.25s	3s
Blinking2	0.5s	2s
Blinking3	0.75s	1s

3.6.2 Inverter LED display define



Name of LED	State of LED	Description
SOL	ON	PV is active
	BLINK	PV is standby
	OFF	PV loss
BAT	ON	Battery is active
	BLINK	Battery is standby
	OFF	Battery loss
GRID	ON	Grid is active
	BLINK	Grid is standby
	OFF	Grid loss
EPS	ON	EPS is active
	BLINK	EPS is overload
	OFF	EPS loss
ERR	ON	Fault state
	BLINK	Warning
	OFF	No fault

4. Installation

Notice Indicates actions that may cause material damage.

4.1 Check for Physical Damage

Make sure the inverter is intact during transportation. If there is any visible damage, such as cracks, please contact your dealer immediately.

4.2 Equipment installation

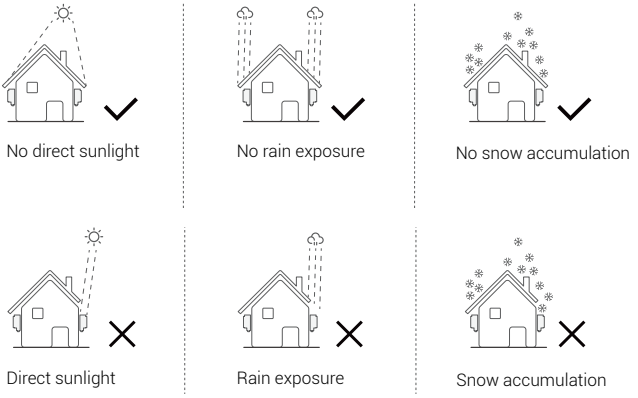
Installation Precaution

HiEnergy series is designed for outdoor installation (IP 65). Make sure the installation site meets the following conditions:

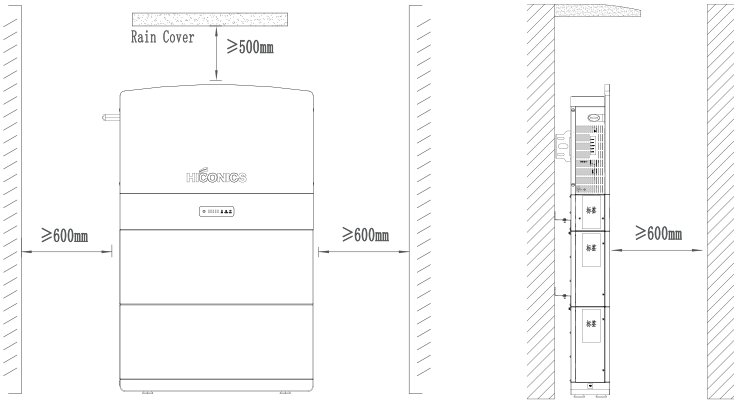
- Not in direct sunlight.
- Not in areas where highly flammable materials are stored.
- Not in potential explosive areas.
- Not in the cool air directly.
- Not near the television antenna or antenna cable.
- Not higher than altitude of about 2000m above sea level.
- Not in environment of precipitation or humidity (＞95%).
- Under good ventilation condition.
- The ambient temperature in the range of -20℃ to +60℃.
- The slope of the wall should be within ± 5°.
- The wall hanging the inverter should meet conditions below:

  1. solid brick/concrete, or strength equivalent mounting surface;
  2. Inverter must be supported or strengthened if the wall's strength isn't enough (Such as wooden wall, the wall covered by thick layer of decoration)

Please **AVOIDE** direct sunlight, rain exposure, snow laying up during installation and operation.



4.2.1 Requirement



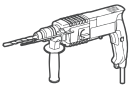
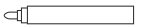
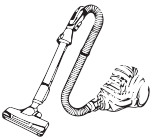
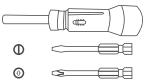
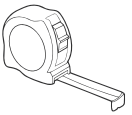
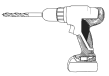
Position	Min size
Left	600mm
Right	600mm
Top	500mm
Front	600mm

Mounting Steps

Note: The inverter mount can be stacked on its battery or other supports.

4.2.2 Required for installation

Installation tools: crimping pliers for binding post and RJ 45, screwdriver, manual wrench etc.

Installation tools			
 impact drill (Φ10mm drill)	 Torque socket wrench	 marker pen	 Vacuum cleaner
 torque wrench	 Torque screwdriver	 Steel tape	 Level ruler
 Electric batch (with M6 socket)	 Detector	 Hammer	

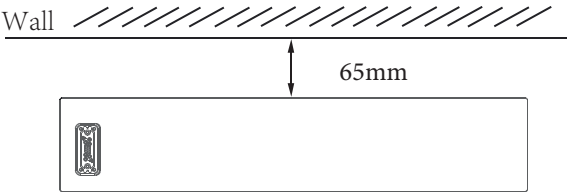
Personal Protective Equipment			
 safety gloves	 safety goggles	 dust mask	 Safety shoes

4.3 Installation process

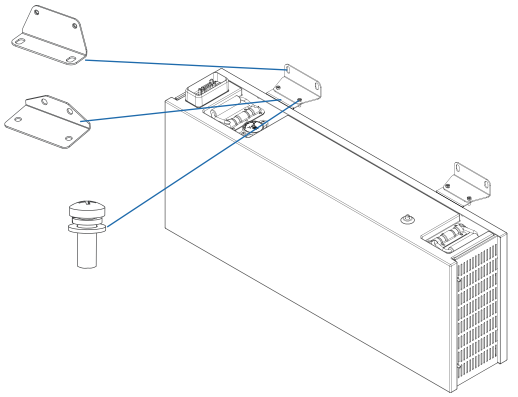
4.3.1 Battery pack installation

The battery pack height must comply with local regulations. If the positioning plate conflicts with the regulations, the regulations must be met first.

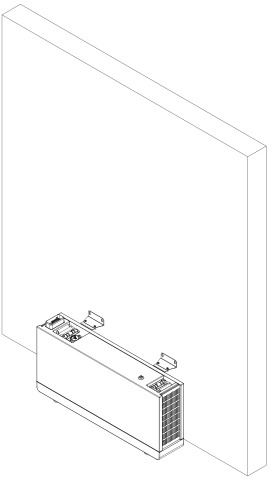
Step 1: Determine the position of the base: mainly determine the height from the ground and the distance from the wall; The distance from the wall is 65mm, and keep horizontal;



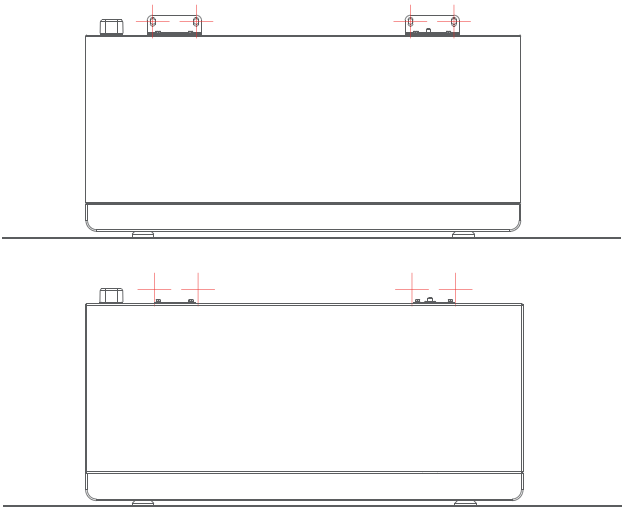
Step 2: Use four cross recessed pan head screws and a three component M5x14 unit to install the battery pack, and wall battery mounts. As shown in the following figure.



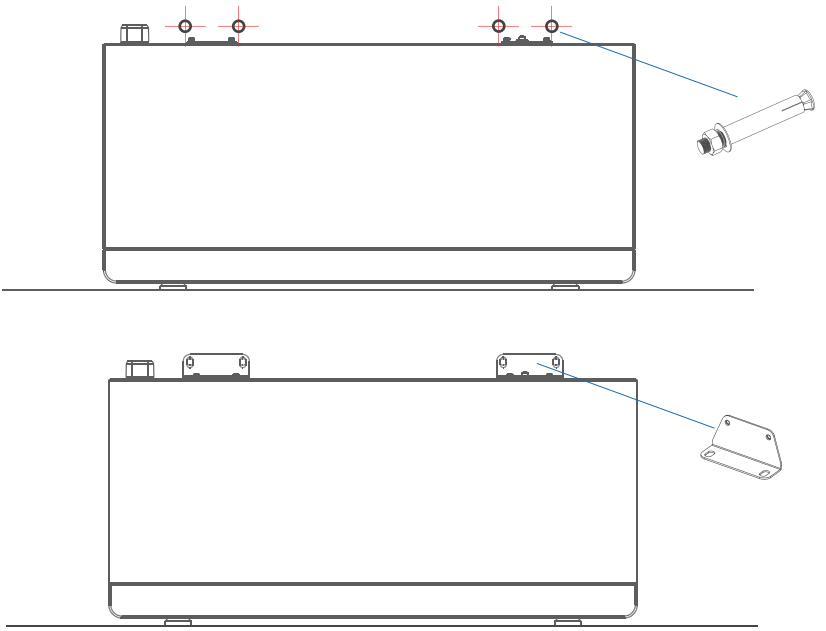
Step 3: Use four cross recessed pan head screws and a three component M5x14 unit to install the battery pack, and wall battery mounts. As shown in the following figure.



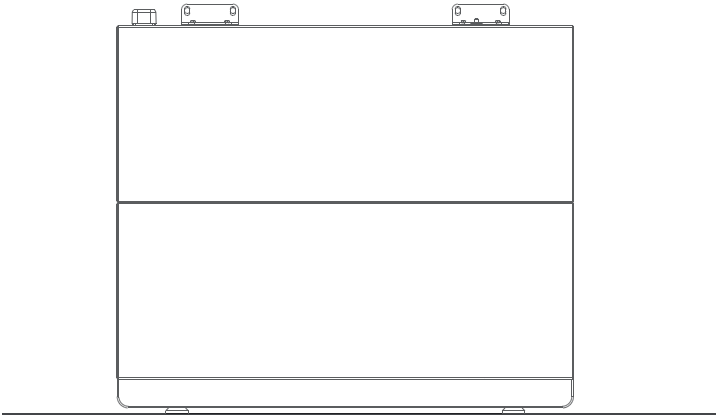
Step 4: Use a marker to draw dots at the red intersection in the following image. After drawing the dots, remove the wall battery pendant and use a drill bit to drill holes.



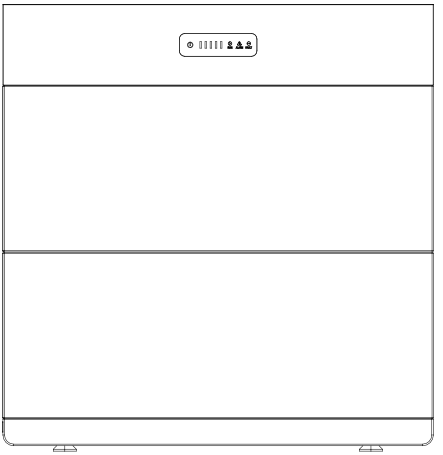
Step 5: Install expansion bolts in the drilled holes. Use the expansion bolt with its own M8 nut to fix the wall battery pendant with the expansion bolt. Afterwards, use four cross recessed pan head screws with M5x14 to fix the wall battery mount and pack mount.



Step 6: Repeat steps 2 to 5 to install the other battery modules required. Please align the lower battery with the front of the upper battery during installation.

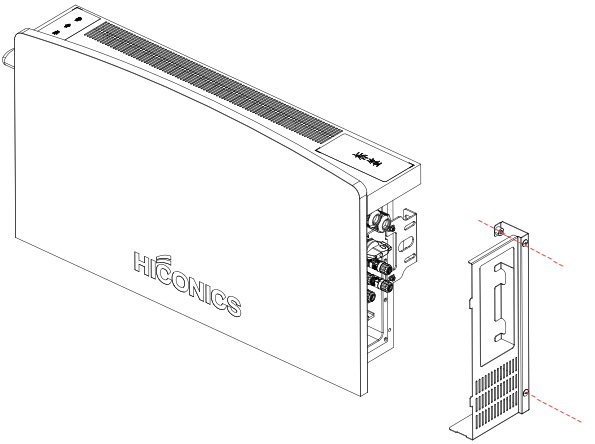


Step 7: After installing the battery module, place the BMS control box on top of the battery box. Please align the BMS control box with the front of the lower battery during installation.

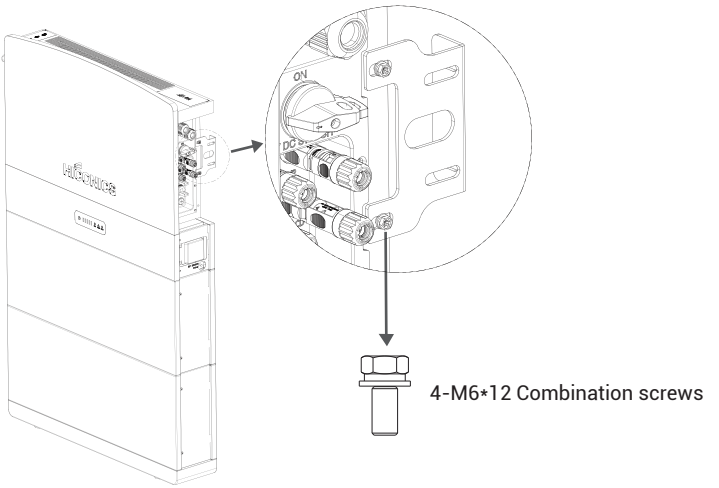


4.3.2 Inverter Installation

Step 1: Open the inverter cover on both sides and place the inverter vertically on the BMS control box.It will build the connection between the inverter and BMS of the control box via PACK and inverter connection cable.



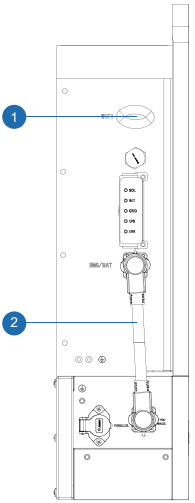
Step 2: Place the inverter on the BMS main box, Fix the inverter on the mounting bracket, adjust the whole system, and ensure that the battery and inverter are firmly hung on the panel and bracket.



5 Electrical Connection

5.1 Battery system cable connection

The HEC2 RESS system is designed as 100% pre-installation internal cables ,the WIFI /battery pack and inverter connection cables are ready, directly plug in, just tighten the waterproof cover.



1 WIFI
2 PACK and inverter connection cable

5.2 PV connection

WARNING

- Before connecting to PV modules, please install a separately DC circuit breaker between inverter and PV modules.
- It is very important for system safety and efficient operation to use appropriate cable for PV module connection. To reduce risk of injury, please use the proper recommended cable size as below.

Wire Size	Cable(mm^2)
12AWG	4

WARNING

- To avoid any malfunction, do not connect any PV modules with possible current leakage to the inverter. For example, grounded PV modules will
- cause current leakage to the inverter. When using PV modules, please be sure NO grounding.

- It is requested to use PV junction box with surge protection. Otherwise, it will cause damage on inverter when lightning occurs on PV modules.

  When selecting proper PV modules, please be sure to consider below parameters:

  1）Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter.

  2）Open circuit Voltage (Voc) of PV modules should be higher than min. start voltage.

  Max. DC Voltage Limitation

Model	HEC2-S3.8Hr2	HEC2-S5.0Hr2	HEC2-S6.0Hr2
Max. DC Voltage（V）	600	600	600
MPPT Voltage Range（V）	100-480	100-480	100-480

Connection Steps:

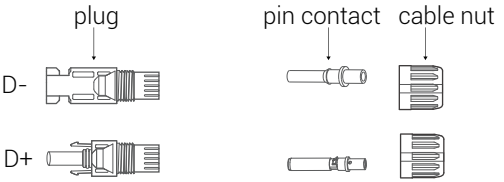
Step 1: Checking PV module.

1.1 Use voltmeter to measure module array voltage.

1.2 Check the PV+ and PV- from the PV string combiner box correctly.

1.3 Please make sure the impedance between the positive pole and negative pole of PV to earth should be MΩ level.

Step 2: Separating the DC connector.



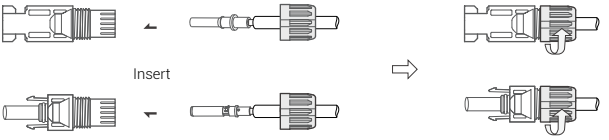
Step 3: Wiring

3.1 Choose the 4 mm² wire to connect with the cold-pressed terminal.

3.2 Remove 10mm of insulation from the end of wire.

3.3 Insert the insulation into pin contact and use crimping plier to clamp it.

Step 4: Insert pin contact through the cable nut to assemble into back of the male or female plug. When you feel or heard a "click" sound the pin contact assembly is seated correctly.



Step 5: Plug the PV connector into the corresponding PV connector on inverter.

5.3 AC input/output Connection

Before connecting to AC input power source, please install a separate AC breaker between inverter and AC input power source . This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of AC input . The recommended of AC breaker is 25A for 3.8kw and 32A for 5/6KW.

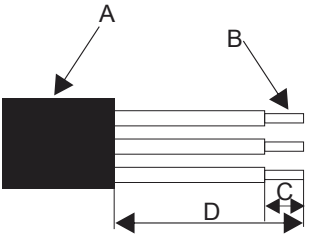
Table Cable and Micro-breaker recommended

Model	HEC2-S3.8Hr2	HEC2-S5.0Hr2	HEC2-S6.0Hr2
Cable	6mm²	6mm²	6mm²
AC breaker	25A	32A	32A

Warning!

There are "L" "N" ''PE'' Symbols marked inside the connector, the Line wire of grid must be connected to "L" terminal; the Neutral wire of grid must be connected to "N" terminal; the Earth of grid must be connect to ''PE

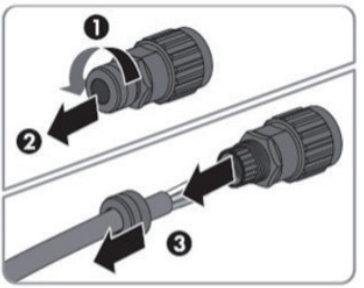
a: Use professional tools to peel off the cables according to the requirements in the table below.



Object	Description	Value
A	External diameter	12mm to 18mm
B	Copper conductor cross-section	4mm² to 10mm²
C	Stripping length of the insulated conductors	approx.13mm
D	Stripping length of the outer sheath of the AC cabl	e approx.53mm

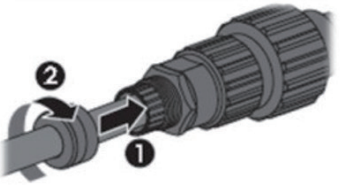
b: Insert the conductor into the suitable ferrule acc. to DIN 46228-4 and crimp the contact.

c: Unscrew the swivel nut from the threaded sleeve and thread the swivel nut and threaded sleeve over the AC cable.

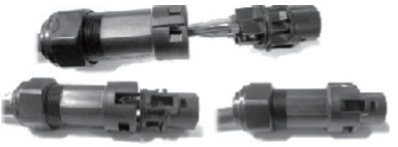


d: Insert the crimped conductors L, N and PE into the corresponding terminals and tighten the screw with a hex key wrench screwdriver (size:2.5, 1.2~2.0 N.m). Ensure that all conductors are securely in place in the screw terminals on the bush insert.

e: Screw the swivel nut onto the threaded sleeve. This seals the AC connector and provides strain relief for the AC cable. When doing so, hold the bush insert firmly by the locking cap. This ensures that the swivel nut can be screwed firmly onto the threaded sleeve.



f: Assembly the plug shell ,adapter as below picture, Push the adapter and Shell by hand until a "Click" is heard or felt.



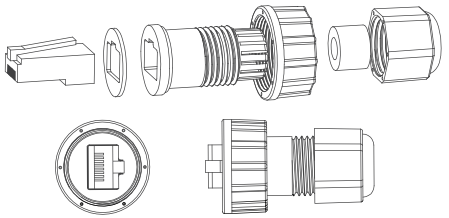
g: Plug the AC connector into the jack for the AC connection by hand until a "Click" is heard or felt.

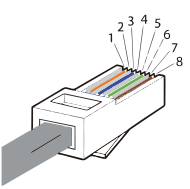
h: Use tool to clamp the AC wiring terminal and wire rod; screw the nut, but do not tighten it. Make sure that the cable is free to pass through the waterproof components. Once the terminal is connected to the right site of the inverter, tighten the nut.

5.4 External ammeter Connection

The electricity meter should be mounted and connected at the grid transition point (feed-in point) so that it can measure the grid reference and feed-in power.

(1)Loosen the nut, and untangle the single-aperture sealing ring.

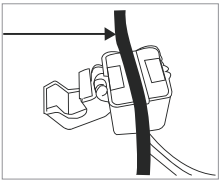


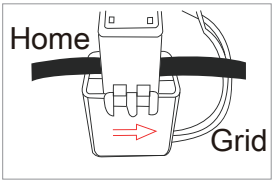


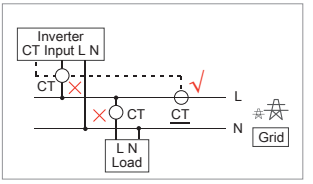
Pin	Description	Pin	Description
1	485A	5	GND
2	485B	6	CT2B
3	CT2A	7	CT1A
4	VCC	8	CT1B

(2)Install the waterproof component and screw on the waterproof sheath nut.

(3)Open the external CT wiring port, the arrow points to the direction of the power grid, put the wire into the external CT card slot, and buckle the buckle.







Notice

External ammeter should be placed near the power grid. If ammeter test pass but inverter still can't achieve export power (power is not controllable or always 0 power output).Please check installation location of the ammeter.

5.5 DRM Port Connections(Optional)

This interface is a dry contact (only for Australia)

DRED means demand response enable device. The AS/NZS 4777.2:2020 required inverter need to support demand

response mode (DRM). This function is for inverter that comply with AS/NZS 4777.2: 2020 standard. Inverter is fully

comply with all DRM. A RJ45 is used for DRM connection.

Pin	Description	Pin	Description
1	DRM 1/5	5	REF
2	DRM 2/6	6	COM
3	DRM 3/7	7	VCC
4	DRM 4/8	8	GND

DEMAND RESPONSE MODES (DRMs)

Mode	Pin Description
DRM 0	Operate the disconnection device
DRM 1	Do not consume power
DRM 2	Do not consume at more than 50% of rated power
DRM 3	Do not consume at more than 75% of rated power AND Source reactive power if capable
DRM 4	Increase power consumption (subject to constraints from other active DRMs)
DRM 5	Do not generate power
DRM 6	Do not generate at more than 50% of rated power
DRM 7	Do not generate at more than 75% of rated power AND Sink reactive power if capable
DRM 8	Increase power generation (subject to constraints from other active DRMs)

5.6 Earth fault alarm connection

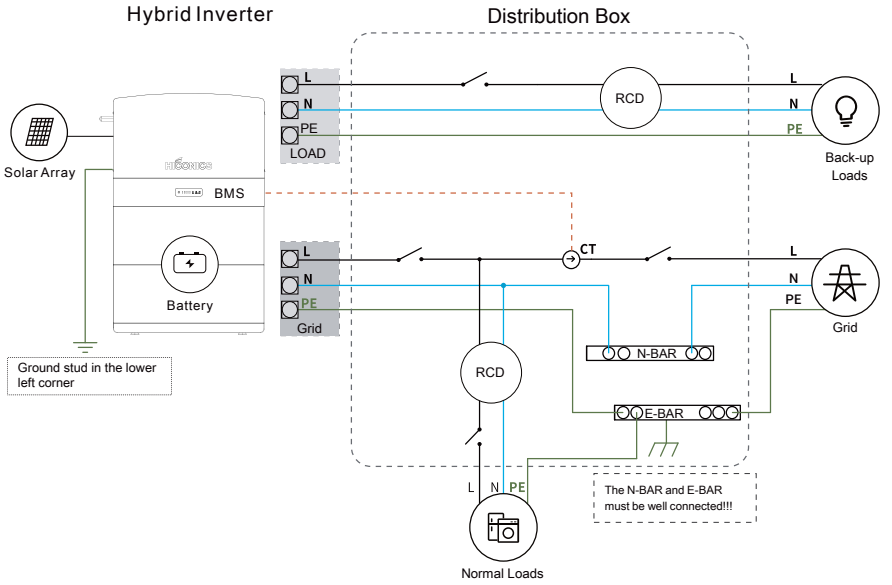
The inverter complies with IEC 62109-2 13.9. The fault indicator LED on the inverter cover will light up and the app will push a message of an error code of F40 indicating the earthing fault,

The inverter should be installed at eye level for convenient maintenance (Adjust the height by placing the foundation)

5.7 Wiring diagram

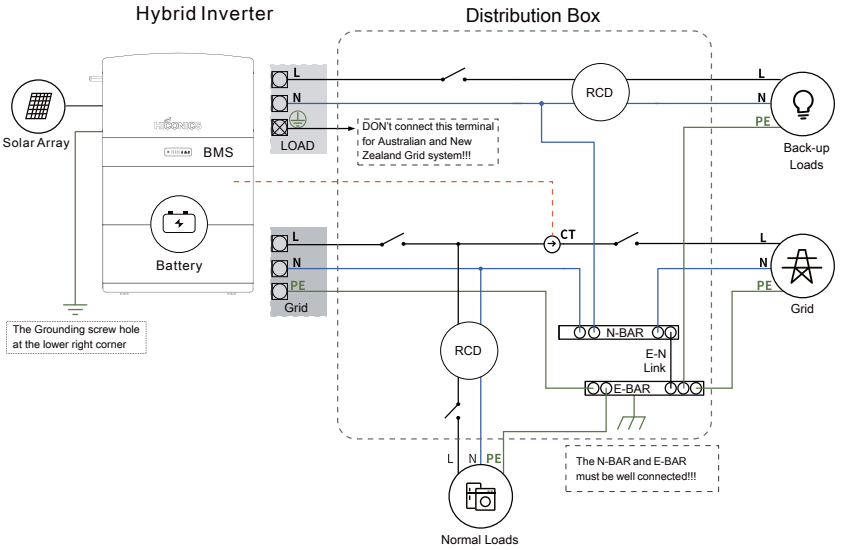
HEC Hybrid Series is designed with two EPS versions for customer to choose based onthe local rules.

E Version applies to the wiring rules that requires the Live line and N (Neutral) line of EPS must be disconnected with he Live line and N (Neutral) line of grid (applies tomost countries).



E Version

For Australia, New Zealand. The neutral points on the GRID side and the LOAD side must be connected together, otherwise the LOAD function does not work.PE grounding:1. The PE terminal of LOAD is vacant and cannot be connected to the grid system of Australia, New Zealand and South Africa.2. There are two PE earthing posts on the PCS shell, one is connected to the shell earthing post of the BMS control box to maintainearthingconti-nuitybetweendifferentstructuralparts,andtheotherPE earthing post needs to be reliably connected to the building earthing ring network nearby.



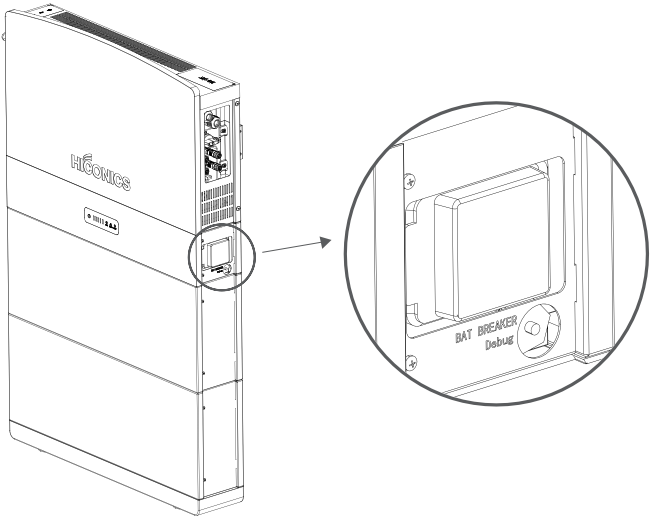
I Version

6 System operation

6.1 Switch On

When turning on the system, it is very important to follow the steps below to prevent damage to the system.

WARNING: Please check the installation again before turning on the system.



Step 1: Turn on the external PV switch.

Step 2: Turn on the external grid switch.

Step 3: If backup load is applied, turn on the external backup switch.

Notice

The Backup switch is only used when a backup load is applied.

Step 4: Open the outer shell of the cable box. Open the battery switch cover and turn on the battery switch on the cable box.

Step 5: Press power button on all the batteries until the indicator lights turn on.

Step 6: Close the battery switch cover and the outer shell of the cable box.

6.2 Switch Off

Step 1: Press the power button on all the batteries, till the lights turn off.

Step 2: Open cable box outer shell, open the battery switch cover and turn off the battery switch.

Step 3: Turn off the external grid switch.

Step 4: If backup load is applied, turn off the external backup switch.

Step 5: Turn off the external PV switch on the cable box.

Step 6: Close the battery switch cover and the outer shell of cable box.

7 Plant Monitoring

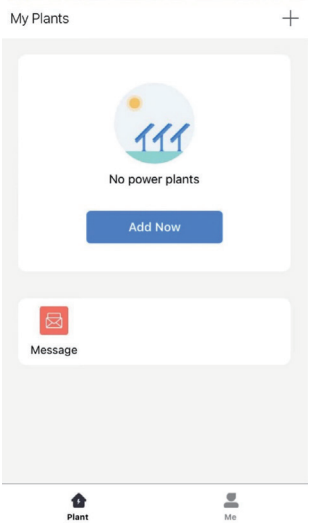
7.1 Create a Plant

Owners can create your own plant at SOLARMAN Platform to run a real-time monitoring. System will collect the data from associated devices, which enables a full understanding of PV plant running status.

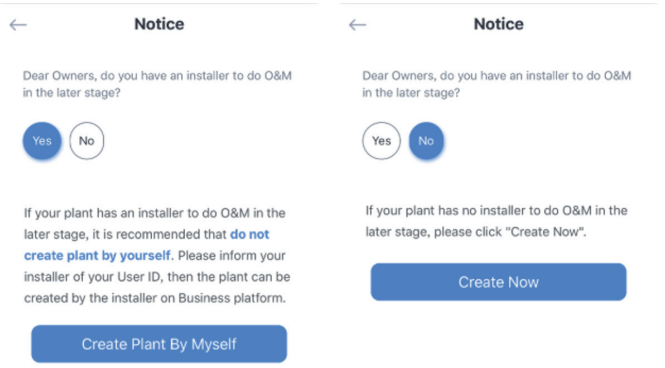
Step 1:" Add Now"

Click "Add Now" to create your plant at SOLARMAN Platform.

Notice: If you have already created a plant, you will not see this page. And if you wish to create another plant, please click "+" in the upper-right corner and select "Create a Plant".



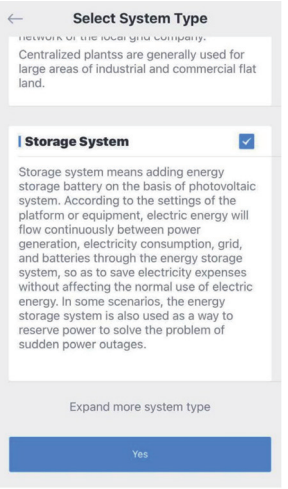
When you enter the following page, please select according to your own situation. If your plant has an installer to do O&M in the later stage, it is recommended that do Not create plant by yourself.



Step 2: Enter Plant Details

Please enter detailed plant information according to your actual situation. System will create a unique plant for you. In order to calculate plant data precisely, please enter:

(1) Plant Name,
(2) Plant Type: Residential Rooftop
(3) System Type: Storage System

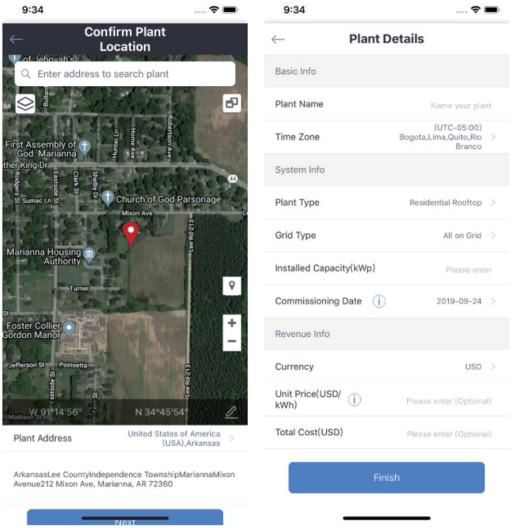


(4) Plant Location,
(5) Installed Capacity,
(6) Time Zone,
(7) Other information.

Please notice:

（1）Click to switch between Google Maps and Amap.Amap will enhance searching &locating ability in China. Google Maps will enhance searching &locating ability globally. Please select accordingly.

（2）Click to switch between 2D Plane Map and Satellite Map.



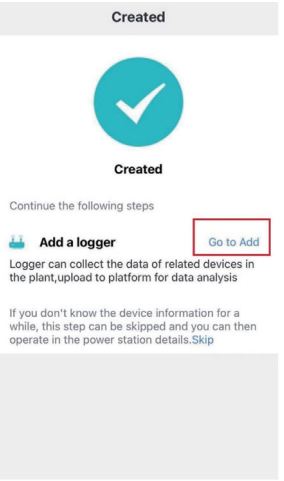
Notice: If your plant has no data after you click "Finish", which means there is no device in your plant.

7.2 Add a Logger

After the plant is created, you can add a logger. Logger can collect running data from PV devices and upload to server, which enables a full understanding of PV plant running status and revenue information. Furthermore, system will determine whether the plant is running normally, which avoid property losses caused by device failure and other reasons.

Step 1: go to add logger

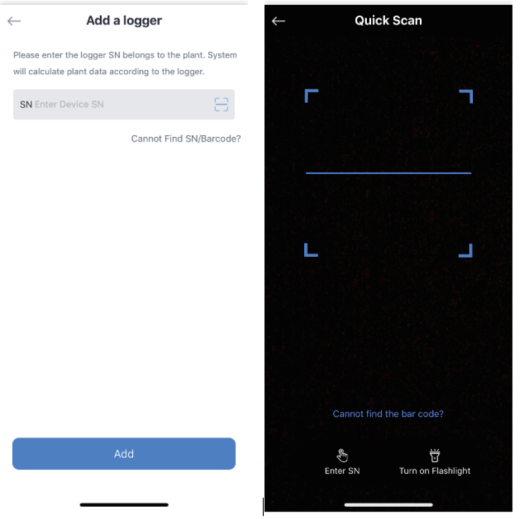
Once the plant is created, you can see the page as below, please click the "Go to Add"



Step 2: Enter Logger SN

You can enter logger SN manually or click icon in the right to scan SN.

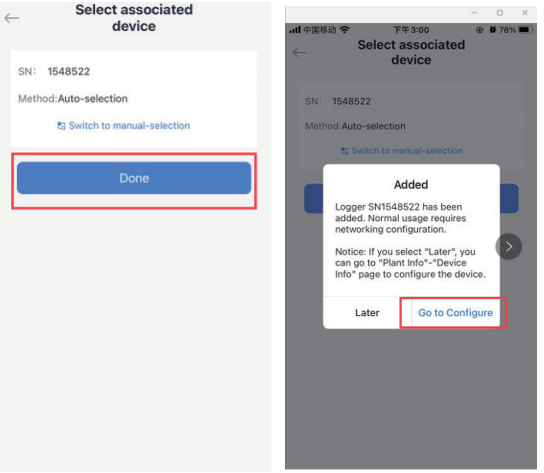
The SN number and the QR code are on the cover of the data dongle, you can find it there.



Notice: If failed to scan the QR code or the scan result data is different with the SN number in the label, please input Sn code manually.

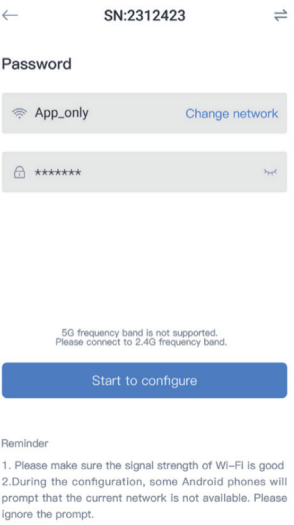
7.3 Networking Configuration

Once finished add the logger SN, then begin to networking configuration.



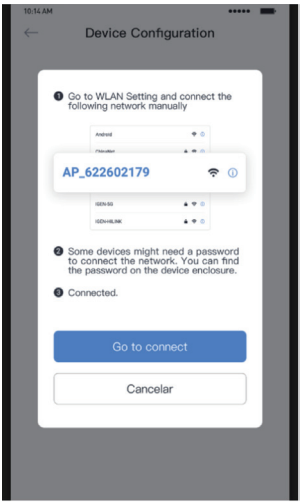
Step 1: Confirm WIFI Info

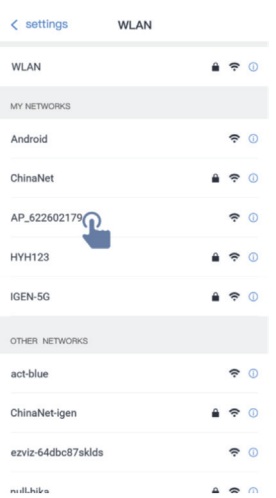
Please make sure your phone has connected to the right WIFI network and click "Start"



Step 2: Connect to AP network

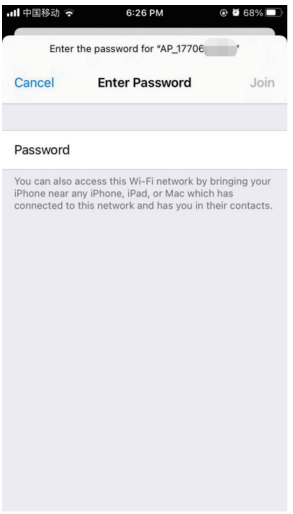
Go to Phone Setting-WLAN, find the right "AP_XXXXX" network and click "Go to connect". Go back to SOLARMAN APP after your phone has connected to AP network.

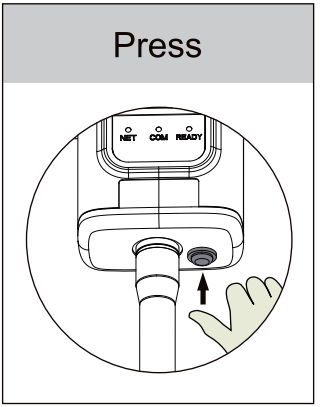




Login the password, and you can find the password in the cover of the data dongle.

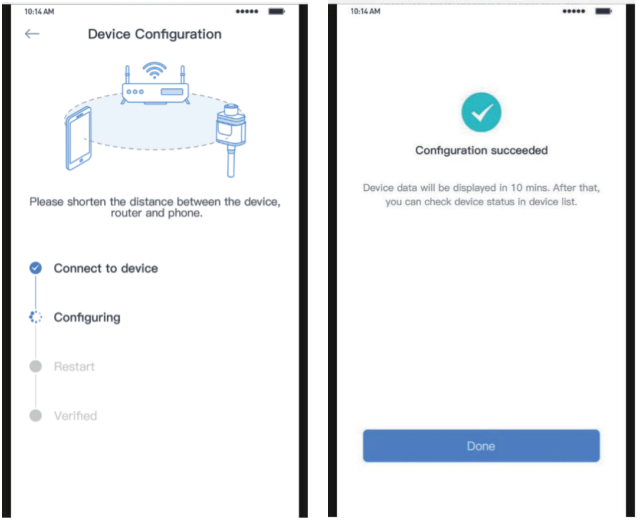
Notice: If you cannot find the "AP_XXXXX" network signal, please restart the WIFI module(Release after 1S short press), shown as below:





Step 3: Auto Configuration

Please wait for a while to complete the configuration. System will switch to the Configured Page automatically. When you go back to "Device List", the logger will still at Offline status. Usually, the data will be updated in 10 mins. Please wait patiently.



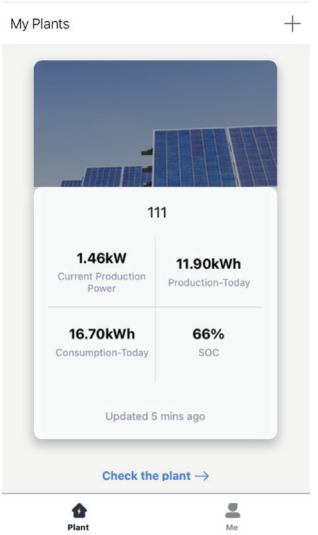
If configuration failure occurs, please check the following reasons and try it again.

1. Make sure the WLAN is on;
2. Make sure WIFI is normal;
3. Make sure wireless router does not implement the white-black list;
4. Shorten the distance between the phone and device;
5. Try to connect to other WIFI;
6. Remove the special characters (such as,; ' ' =)in WIFI network.

8 APP View Data

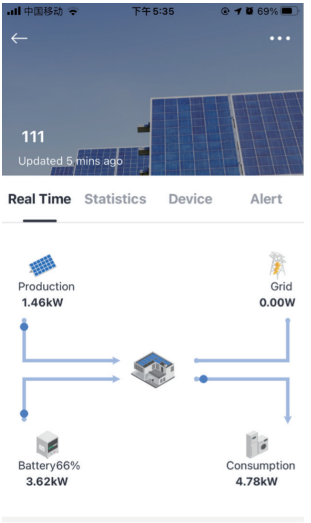
After the plant and device setup is done, you can check plant data remotely.

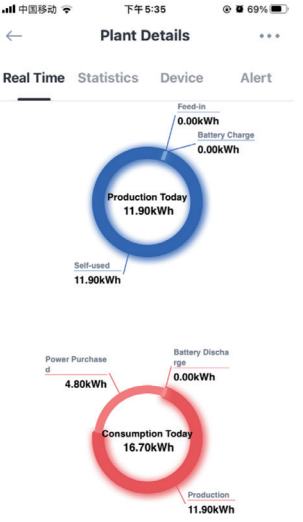
Notice: Please check plant data 10 minutes later after networking configuration.



8.1 Real time data

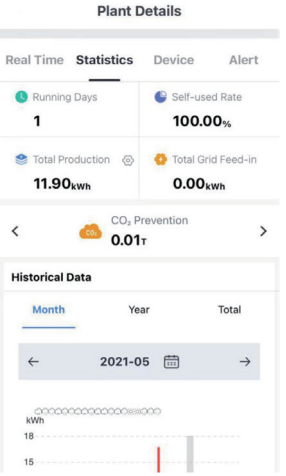
Click the plant as shown above, you can check various data on this page. E.g. Flow Chart, 24H Curve, Production, Consumption, anticipated yield, etc.





8.2 Statistics data

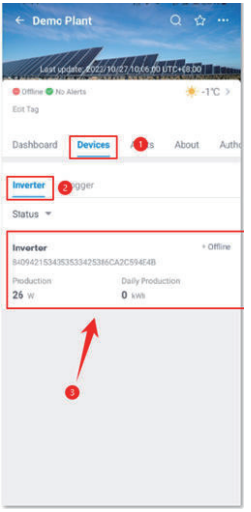
You can check plant statistics and historical data on this page. You can filter specific date and conditions to query.

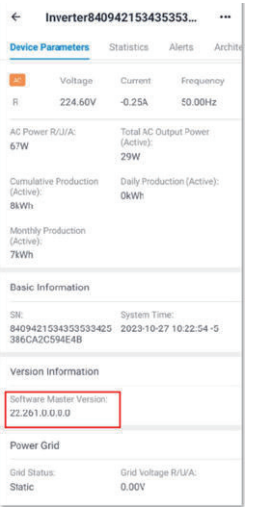


8.3 Device Info

1) Follow the guidelines in section 8.1 to enter the power station details, switch to the device page and click on the inverter to enter.

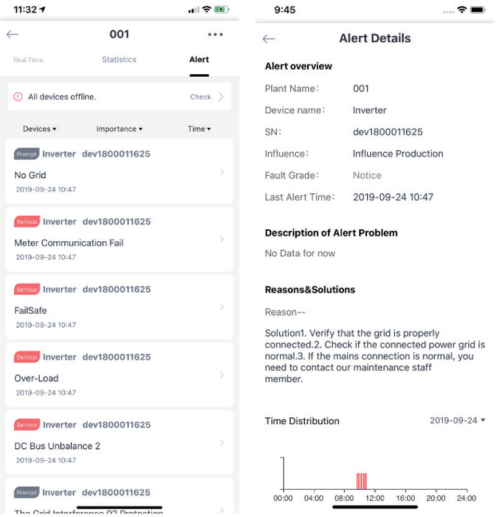
2) Slide the page to find the information of the settings and firmware version. Notice that the software main version number has 6 digits, where the first digit on the left represents the Arm programme version number and the second digit represents the DSP programme version number.





8.4 Alert data

You can check plant alert on this page. Alert will be distinguished from alert importance and alert content, which enables you to understand the importance of alerts. Through these alert message, you can learn the fault status of your plant, which avoids property losses.



9 Remote setup for Installers

Permission to operate commands and firmware is only granted by the authorized account.Installers get the authorized accounts from distributor that has super admin account. The super admin was authorized by Hiconics.Unauthorised accounts do not have access to commands or firmware.

Once settings are selected at commissioning they are locked to view only.

9.1 Grid regional standard

Click “Device control” to move corresponding options.

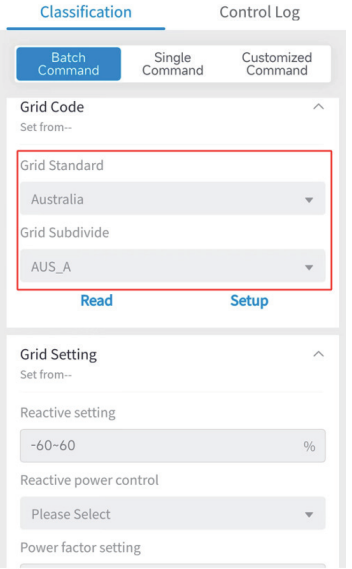
“Read"is for downloading the data of current device,

“Setup” is for uploading the set up value.

Under “Grid Code", here are several standards for selection, including China, Germany, Australia, Italy, Spain and U.K.(Continuing to add)

After set up“ Australia", you can continue to select grid subdivide-AUS_A,AUS_B or AUS_C. And then click “Setup” to upload the selection.

Notice: The grid-connected relay will not engage until Australia Region A,B,C is selected according to the section 4.1 of AS4777.2 2020.



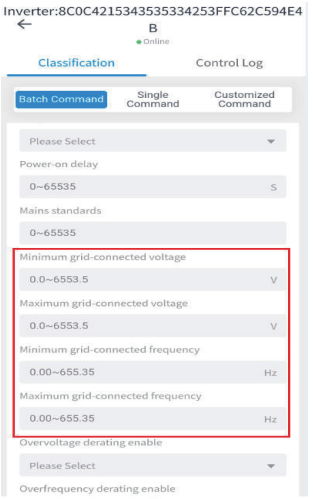
9.2 Grid protection value and power quality response

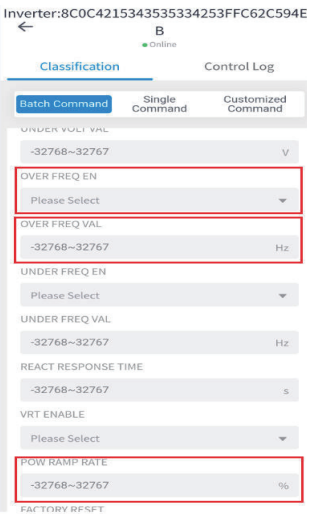
When you completed the selection of grid standard, the grid setting will be automatically adjusted to the values what corresponding grid standard requires.

After selecting the regional standard, you can also set the protection values(if required)-like gridover-frequency, under-frequency,over-voltage and under-voltage protection-points etc.

In the command, you can set the "overfrequency derating enable" to enable, write the " overfrequency derating frequency" value and the "power retardation" value, so that when thegrid frequency exceeds the overfrequency derating frequency, the device will derate the active power in accordance with a certain gradient.

Notice: Once the power quality and grid settings have been selected at commissioning these settings will be locked automatically locked. from editing(Unless using super admin account)





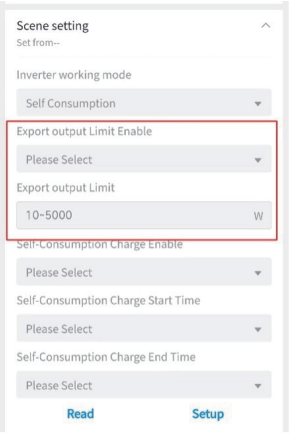
9.3 Advanced Function

-Export output limit

Limiting inverter power to be injected into the grid, disable by default.

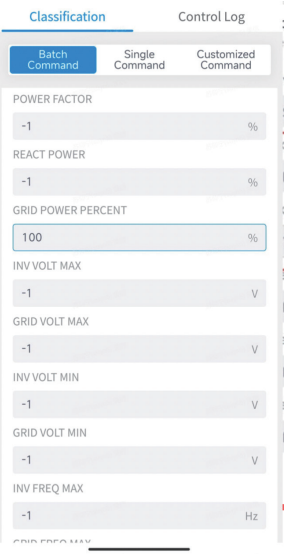
When export limiting is required by local grid standards and requirements, click "Export output Limit Enable" and enable this function and then enter detailed value of export output limiting. This function is controlled completely by soft limiting.

Reducing power output by software when the feed-grid current is higher than the limit value.



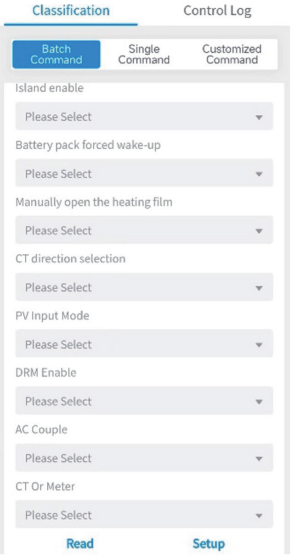
-Grid power limit

Just set percent value depends on nominal AC power to limit generation power.



-DRM(Demand Response Mode)

Only applicable in Australia and New Zealand. Default option is disabling.



10 Maintenance and Troubleshooting

10.1 Maintenance before operation

1. Before the inverter is put into operation, read the instruction manual carefully, and strictly execute the connection and installation of the equipment according to the requirements on the manual.
2. Carefully check whether the various parts of the inverter as well as the terminals are looseand fall off in the process of transporting.
3. Carefully check whether the diameter of eachwire of the inverter is in accordance with the requirements; whether the insulating property is good or not; and whether the ground- -ing of the system is in accordance with the regulations ornot. Note: When using the inverter, it should be operated in strict accordance with theinstructions for using and maintaining the inverter, and the warning signs on the inverter shouldbe intact. Maintenance of inverter during operation.

10.2 Maintenance during operation

1. In the process of inverter commissioning, regularly check whether the inverter wires are firm, and check whether the dust net, fan, power module, terminals and other parts are functioningnormally.
2. The inverter cabinet has high pressure, usually should pay attention to check whether the cabinet door is locked or not.
3. When the room temperature exceeds 30℃, effective cooling measures should be taken to prevent the inverter from overheating and burning.
4. The structure and electrical connection of the inverter should be kept intact, and there shouldbe no corrosion, accumulation of dust, etc. The inverter should not have large vibration and abnormal noise during operation.
5. Regularly disconnect the circuit breaker of AC output side of the inverter once.
6. When the DC bus capacitor temperature in the inverter is too high or exceeds the service life, it should be found and replaced in time.
7. the inverter belongs to high reliable operation equipment, can achieve long-term trouble-free operation, weekdays should carry out inspections, listen to the inverter sound is normal, theexternal debris, whether the vent is dust, the panel display is normal, found that the problem isdealt with in a timely manner, report.

Note: Non-professionals should not disassemble and overhaul the inverter without permission.Inverter generally have short circuit, over current, over voltage, overheating and other items ofautomatic protection, when the problem occurs, do not need to manually shut down.

10.3 Troubleshooting

Fault code	Fault name	Solution
1	NVM checksum failure	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.
2	DSP communication failure	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.
3	BMS communication failure	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.
4	Battery overvoltage alarm	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.
5	Battery undervoltage alarm	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.
6	Battery overtemperature alarm	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.
7	Battery undertemperature alarm	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.
8	Battery overcurrent alarm	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.
9	Battery voltage difference too large	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.
10	Temperature difference too large	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.
11	Battery SOC too high	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.

12	Battery SOC too low	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.
13	Other battery alarms	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.
14	Grid over voltage	1. If the problem occurs occasionally, the utility grid may be abnormal temporarily.The inverter will recover automatically after detecting that the utility grid is normal. 2. If the problem occurs frequently, check whether the grid voltage is within the permissible range. • Contact the local power company if the grid voltage exceeds the permissible range. • Modify the overvoltage protection threshold, HVRT or disable the overvoltage protection function after obtaining the consent of the local power company if the grid frequency is within the permissible range. 3. Check whether the AC breaker and the output cables are connected securely and correctly if the problem persists.
15	Grid under voltage	1. If the problem occurs occasionally, the utility grid may be abnormal temporarily. The inverter will recover automatically after detecting that the utility grid is normal. 2. If the problem occurs frequently, check whether the grid voltage is within the permissible range. • Contact the local power company if the grid voltage exceeds the permissible range. • Modify the undervoltage protection threshold, LVRT or disable the undervoltage protection function after obtaining the consent of the local power company if the grid frequency is within the permissible range. 3. Check whether the AC breaker and the output cables are connected securely and correctly if the problem persists.
16	Grid over current	1. If the problem occurs occasionally, the utility grid may be abnormal temporarily.The inverter will recover automatically after detecting that the utility grid is normal. 2.Contact the dealer or the after-sales service if the problem occurs frequently.
17	Grid frequency abnormal	1. If the problem occurs occasionally, the utility grid may be abnormal temporarily.The inverter will recover automatically after detecting that the utility grid is normal. 2. If the problem occurs frequently, check whether the grid frequency is within the permissible range. • Contact the local power company if the grid frequency exceeds the permissible range. • Modify the frequency protection threshold or disable the overfrequency protection function after obtaining the consent of the local power company if the grid frequency is within the permissible range.

18	DC bus over voltage	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.
19	DC bus under voltage	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later Contact the dealer or the after-sales service if the problem persists.
20	PCS over temperature	1. Check the ventilation and the ambient temperature at the installation point. 2. If the ventilation is poor or the ambient temperature is too high, improve the ventilation and heat dissipation. 3. Contact the dealer or after-sales service if both the ventilation and the ambient temperature are normal.
21	PV over temperature	1. Check the ventilation and the ambient temperature at the installation point. 2. If the ventilation is poor or the ambient temperature is too high, improve the ventilation and heat dissipation. 3. Contact the dealer or after-sales service if both the ventilation and the ambient temperature are normal.
22	PVA over current	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.
23	PVB over current	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later. Contact the dealer or the after-sales service if the problem persists.
24	BuckBoost A over current	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.
25	BuckBoost B over current	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.
26	Battery side DC over voltage	1.If the problem occurs occasionally,Check battery input voltage, if it's within normal range,The inverter will recover automatically. 2.Contact the dealer or the after-sales service if the problem occurs frequently.
27	Battery side DC under voltage	1.If the problem occurs occasionally,Check battery input voltage, if it's within normal range,The inverter will recover automatically. 2.Contact the dealer or the after-sales service if the problem occurs frequently.

28	PVA over voltage	Check the serial connection of the PV array.Make sure that the open circuit voltage of the PV string is not higher than the maximumoperating voltage of the inverter.
29	PVB over voltage	Check the serial connection of the PV array.Make sure that the open circuit voltage of the PV string is not higher than the maximumoperating voltage of the inverter.
30	Ambient abnormal	1. Check the ventilation and the ambient temperature at the installation point. 2. If the ventilation is poor or the ambient temperature is too high, improve the ventilation and heat dissipation. 3. Contact the dealer or after-sales service if both the ventilation and the ambient temperature are normal.
31	Residual Current Fault	1. If the problem occurs occasionally, it may be caused by a cable exception. The inverter will recover automatically after the problem is solved. 2. Check whether the impedance between the PV string and PE is too low if the problem occurs frequently or persists.
32	PVA over voltage	Check the serial connection of the PV array.Make sure that the open circuit voltage of the PV string is not higher than the maximumoperating voltage of the inverter.
33	PVB over voltage	Check the serial connection of the PV array.Make sure that the open circuit voltage of the PV string is not higher than the maximumoperating voltage of the inverter.
34	Ambient abnormal	1. Check the ventilation and the ambient temperature at the installation point. 2. If the ventilation is poor or the ambient temperature is too high, improve the ventilation and heat dissipation. 3. Contact the dealer or after-sales service if both the ventilation and the ambient temperature are normal.
35	Residual Current Fault	1. If the problem occurs occasionally, it may be caused by a cable exception. The inverter will recover automatically after the problem is solved. 2. Check whether the impedance between the PV string and PE is too low if the problem occurs frequently or persists.
36	Hardware abnormal	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.
37	Precharge abnormal	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.

38	Insulation fault	1. Check whether the resistance of the PV string to PE exceeds 50kΩ. If no, check the short circuit point. 2. Check whether the PE cable is connected correctly. 3. If the resistance is lower on rainy days, please reset the ISO.
39	AC side relay abnormal	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.
40	PVA Reverse Connection Fault	Check whether the PV strings are connected reversely.
41	PVB Reverse Connection Fault	Check whether the PV strings are connected reversely.
42	Hardware DC Bus Over Voltage	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.
43	Hardware Battery Over Voltage	Disconnect the AC output switch, DC input switch and Battery switch, then connect them 5 minutes later.Contact the dealer or the after-sales service if the problem persists.
44	Grid 10 minutes Over Voltage	1. If the problem occurs occasionally, the utility grid may be abnormal temporarily. The inverter will recover automatically after detecting that the utility grid is normal. 2. If the problem occurs frequently, check whether the grid voltage is within the permissible range. • Contact the local power company if the grid voltage exceeds the permissible range. • Modify the grid overvoltage rapid protection threshold after obtaining the consent of the local power company if the grid voltage is within the permissible range.
45	EPS(Off-grid) Overload Fault	1. If the problem occurs occasionally, the EPS load may be abnormal temporarily. The inverter will recover automatically after few minutes. 2. If the problem occurs frequently, check whether the EPS load is within the permissible range. 3.Contact the dealer or the after-sales service if the problem persists.

11 Packaging, transportation, storage

- The system cabinet is packed in cardboard packaging and the internal PE packaging bag is moisture-proof and waterproof.
- Use EPE pearl cotton foam pad in the middle to prevent damage to the system during handling and transportation.
- Transportation must comply with UN3481's dangerous goods transportation and local laws and regulations.
- The system is heavy and must use the mechanical handling.
- Transportation temperature: -10℃ ~ 40℃.
- The equipment and packaging cannot be sprayed, so it cannot be transported in the open air.
- Storage temperature:
    - -20 ° C ~ 25 ° C, 12month;
    - -20 ° C ~ 45 ° C, 3month;
    - -20 ° C ~ 60 ° C, 1month;

      (The SOC before storage is kept in the range of 40% to 60%)
- Storage humidity: 0%~95%RH（No condensation）
- The storage room should be kept ventilated, the room should be clean and dry, and it should be protected from dust and moisture.
- The storage time can be up to 6 months. It is recommended to charge and discharge the system for more than the time.
- Storage room sunlight cannot be directly exposed to the system.

Annex 1: Inverter parameter

Technical Data	HEC2-S3.8Hr2	HEC2-S5.0Hr2	HEC2-S6.0Hr2
PV Input			
Max.PV array power	7500W	7500W	7500W
Max.DC voltage	600V		
Nominal DC operating voltage	360V		
MPP voltage range	100V-480V		
MPP voltage range for nominal power	136V-480V	176V-480V	210V-480V
Start up voltage	120V		
Max.input current(A/B)	15A/15A		
Max.short circuit current(A/B)	18A/18A		
Max.inverter backfeed current to array	0		
No.of MPP tracks/String per MPP tracker	2/1		
BAT Side			
Battery voltage range	85V-400V		
Battery voltage range for nominal power	162V-400V	210V-400V	250V-400V
Recommended battery voltage[V]	300V		
Max.charge/discharge current[A]*2	25/25		
Communication interfaces	RS485/CAN		
Reverse connect protection	Yes		
AC Grid Side(On-grid)			
Nominal AC output power	3800W	5000W*1	6000W*1
Max.Output Power	3800W	5000W*1	6000W*1
Nominal Apparent Power Output to Utility Grid	3800VA	5000VA*1	6000VA*1
Max. Apparent Power Output to Utility Grid	3800VA	5000VA*1	6000VA*1
Nominal Apparent Power from Utility Grid	3800VA	5000VA*1	6000VA*1
Max. Apparent Power from Utility Grid	3800VA	5000VA*1	6000VA*1
Nominal grid voltage	230V/220V		
Grid Voltage Range	180V-280V		
Nominal grid frequency	50Hz/60Hz		
AC Grid Frequency Range	45Hz-65Hz		
Max. output AC current to Utility Grid	16.5A	21.8A	26.1A
Rate output AC current to Utility Grid	16.5A	21.8A	26.1A
Rated AC Current From Utility Grid	16.5A	21.8A	26.1A
Max. AC Current From Utility Grid	16.5A	21.8A	26.1A
Max.output overcurrent protection	20.6A@10sec	27.2A@10sec	32.6A@10sec
Max.output fault peak current	32.5A@0.1ms	43A@0.1ms	52A@0.1ms
Inrush Peak current	65A@5us		
Power factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)		
I.THD	<3%@Rated power		

EPS Side			
Back-up Nominal Apparent Power	3800VA	5000VA	6000VA
Nominal power	3800W	5000W	6000W
Max. Output Apparent Powerwithout Grid	4750VA@10sec	6250VA@10	7500VA@10
Max. Output Apparent Power with Grid	4750VA@10sec	6250VA@10	7500VA@10
Nominal output voltage	230V(±2%)		
Nominal output frequency	50Hz/60Hz(±0.2%)		
Nominal Output Current	16.5A	21.8A	26.1A
Max.output current	16.5A	21.8A	26.1A
Max.output overcurrent protection	20.6A@10S	27.2A@10S	32.6A@10S
Max.output fault peak current	32.5A@0.2mS	43A@0.2mS	52A@0.2mS
Inrush peak Current	65A@5uS	65A@5uS	65A@5uS
Changeover time	<20ms		
Switching from Grid Connected Mode to Standalone Mode	<20ms		
Switching from standalone mode to network connected mode	2s		
Output THD	<3%@Linear Load		
EFFICIENCY			
MPPT efficiency	99.9%		
Euro efficiency	97.02%		
Max.efficiency	97.6%		
Battery charge/discharge efficiency	97.6%(PV-BAT),96.5%(BAT-AC)		
ENVIRONMENT LIMIT			
Ingress protection	IP65		
Protection class	Class Ⅰ		
Pollution degree	PD3		
Over voltage category	Ⅲ(MAINS), Ⅱ(DC)		
Operating temperature range	-20℃~+60℃(derating at +45)		
Max.operation altitude	<2000m		
Humidty	0-95%		
Clooling Method	Natural Convection		
User Interface	LED,APP		
Communication with BMS	CAN/485		
Communication with Meter	485		
Communication with Portal	WIFI		
Typical noise emission	<40dB		
Dimension（W*H*D）	800mm*450mm*160mm		
Weight	32KG		
Topology	Non-isolated		
Self-consumption at Night	<15W		
DC Connector	MC4 (4~6mm2)		

AC Connector	Quick Plug
Storage Temperature	-40 C ~+85 C
Standard warranty	10years
STANDARD	
Safety	IEC/EN 62109-1&2, IEC62477
EMC	IEC61000-6-1, IEC61000-6-3
Environment	IEC60529,IEC60068
Efficiency	IEC61683
Certification	EN50549-1,G99,CEI021,VDE4105,AS4777.2

Remark:
*1:The grid feed in power for VDE4105 is limited 4600VA;
*2:Battery charging current is limited 25A and power is limited 6000W.

Annex2:Battery parameters

Mode	HEC2-BHP100r2
Component	Base+BMS+2*Module
Nominal Voltage	204.8V
Battery Voltage Range	185.6V~224V
Number of Battery Modules	2
Rated Capacity	50Ah
Total Energy	10.2kWh
Usable Energy	9.2kWh
Nominal Power	5.12kW
Maximum Charge/Discharge Current	25A
Cycle Life	6000 Cycles (@25°C,0.5C/0.5C, 70%EOL)
Expected Life Time	10Years
Available Charge/Discharge Temperature Range	0°C to 55°C / -20°C to 55°C
	-20°C to 55°C(Build-in heating function)/-20°C to 55°C
Storage Temperature	-20°C to 50°C (3 months)
	0°C to 40°C (1 year)
Humidity	15~95%
Altitude	Below 2000m
Ingress Protection	IP65
Communication	RS485/CAN2.0
Status Indicator	LED Lights
SOC Indicator	5LED (20%, 40%, 60%, 80%,100%)
Switch on/off	Button*1+Breaker*1
Certificate	CE,IEC62619,IEC62040,IEC60529,IEC61000,UN38.3
Weight	124kg
Dimension(W*H*D)	800*840*160mm
Remark	1 Series

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