

INSTALLATION, OPERATION &  
MAINTENANCE MANUAL

***All-in-one with off-grid  
inverter***

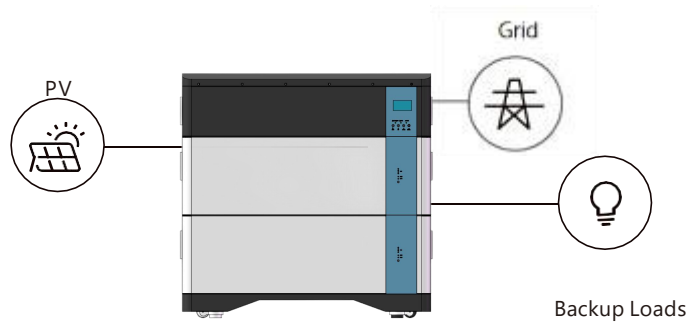
***ENERGY STORAGE SYSTEM***

01 Introduction

1.1 System Introduction

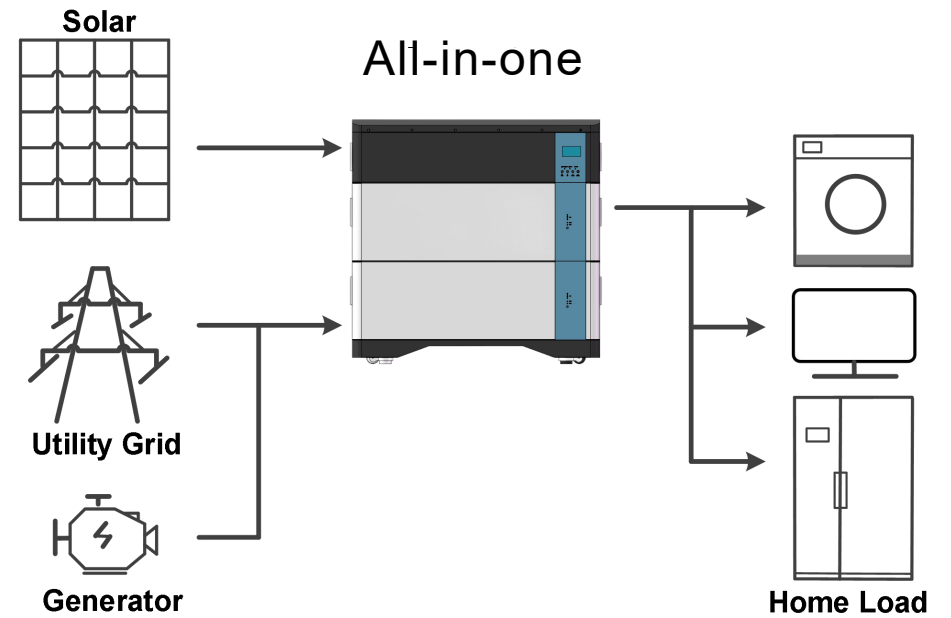
IYP-14.3kwh-8kw-A1 (including IYP-Pack14.3KWh-A3 and 8KF1-A1)/ IYP-28.6KWH-8KW-A1 (including IYP-Pack28.6KWh-A3 and 8KF1-A1) can be used in DC coupled systems (mainly newly installed), Ac coupling system (mainly transformation) and off-grid system (mainly transformation, photovoltaic capacity increase), the scheme is as follows:

Solution	Configuration	
	Inverter	Battery
IYP-14.3KWH-8KF1-A1	8KF1-A1	IYP-14.3KWH-A3
IYP-28.6KWH-8KF1-A1	8KF1-A1	IYP-28.6KWH-A3



IYP-10KWH-5KF-L3  
Figure1 DC-coupled Storage System – Scheme

1.2 System diagram





This sign indicates a hazardous situation which, if not avoided, could result in death or serious injury!



The Storion H5/H3 must not be touched or put into service until 5 minutes after it has been switched off or disconnected to prevent an electric shock or injury.



This sign shows danger of hot surface!



Refer to the operating instructions.

### 1.3.1. Setting of Warning Sign for Safety

During instruction, maintenance and repair, follow the instructions below to prevent non-specialist personnel from causing misuse or accident:

- Obvious signs should be placed at front switch and rear-level switch to prevent accidents caused by false switching.
- Warning signs or tapes should be set near operating areas.
- The system must be reinstalled after maintenance or operation.

### 1.3.2 Measuring Equipment

To ensure the electrical parameters to match requirements, related measuring equipment are required when the system is being connected or tested. Ensure that the connection and use matched specification to prevent electric arcs or shocks.

### 1.3.3 Moisture Protection

It is very likely that moisture may cause damages to the system. Repair or maintaining activities in wet weather should be avoided or limited.

### 1.3.4 Operation After Power Failure

The battery system is part of the energy storage system which stores life-threatening high voltage even when the DC side is switched off. Touching the battery outlets is strictly prohibited. The inverter can keep a life-threatening voltage even after disconnecting it from the DC and /or AC side. Therefore, for safety reasons, it must be tested with a properly calibrated voltage tester before an installer works on the equipment.

### 1.4.1 Battery Safety Datasheet

#### Hazard Information

#### Classification of the hazardous chemical

Exempt from classification according to Australian WHS regulations.

#### Other hazards

This product is a Lithium Iron Phosphate Battery with certified compliance under the UN Recommendations on Transport of Dangerous Goods, Manual of Tests and Criteria, Part III, subsection 38.3. For the battery cell, chemical materials are stored in a hermetically sealed metal case, designed to withstand temperatures and pressures encountered during normal use. As a result, during normal use, there is no physical danger of ignition or explosion and chemical danger of hazardous materials' leakage. However, if the product is exposed to a fire, added mechanical shocks, decomposed, added electric stress by misuse, the gas release vent will be operated. The battery cell case will be breached at the extreme. Hazardous materials may be released. Moreover, if heated strongly by the surrounding fire, acrid or harmful fume may be emitted.

### 1.4.2 Safety Datasheet

For detailed information please refer to the provided battery safety datasheet.

## 1.5 General Precautions

### DANGER

Danger to life due to high voltages of the PV array, battery and electric shock. When exposed to sunlight, the PV array generates dangerous DC voltage which will be present in the DC conductors and the live components of the inverter. Touching the DC conductors or the live components can lead to lethal electric shocks. If you disconnect the DC connectors from the system under load, an electric arc may occur leading to electric shock and burns.

- ◆ Do not touch uninsulated cable ends.
- ◆ Do not touch the DC conductors.
- ◆ Do not open the inverter and battery.
- ◆ Do not wipe the system with damp cloth.
- ◆ Have the system installed and commissioned by qualified people with the appropriate skills only.
- ◆ Prior to performing any work on the inverter or the battery pack, disconnect the inverter from all voltage sources as described in this document.

### WARNING

Risk of chemical burns from electrolyte or toxic gases. During standard operation, no electrolyte shall leak from the battery pack and no toxic gases shall form. Despite careful construction, if the Battery Pack is damaged or a fault occurs, it is possible that electrolyte may be leaked or toxic gases formed.

- ◆ Do not install the system in any environment of temperature below -10°C or over 50°C and in which humidity is over 90%.
- ◆ Do not touch the system with wet hands.
- ◆ Do not put any heavy objects on top of the system.
- ◆ Do not damage the system with sharp objects.
- ◆ Do not install or operate the system in potentially explosive atmospheres or areas of high humidity.
- ◆ Do not mount the inverter and the battery pack in areas containing highly flammable materials or gases.
- ◆ If moisture has penetrated the system (e.g. due to a damaged enclosure), do not install or operate the system.
- ◆ Do not move the system when it is already connected with battery modules. Secure the system to prevent tipping with restraining straps in your vehicle.
- ◆ The transportation of IYP-A1/A3 must be made by the manufacturer or an instructed personal. These instructions shall be recorded and repeated.

- ◆ A certified ABC fire extinguisher with minimum capacity of 2kg must be carried along when transporting.
- ◆ It is totally prohibited to smoke in the vehicle as well as close to the vehicle when loading and unloading.
- ◆ For the exchange of a battery module, please request for new hazardous goods packaging if needed, pack it and let it be picked up by the suppliers.
- ◆ In case of contact with electrolyte, rinse the affected areas immediately with water and consult a doctor without delay.

### CAUTION:

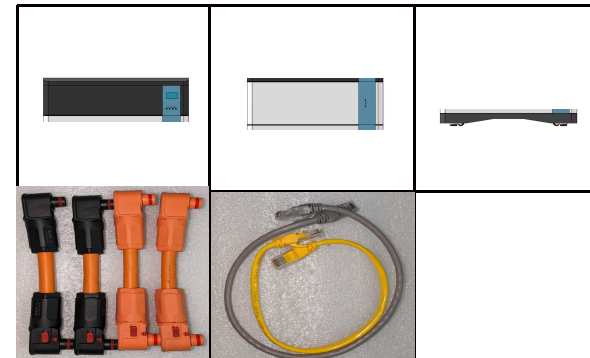
Risk of injury through lifting or dropping the system. The inverter and battery are heavy. There is risk of injury if the inverter or battery is lifted incorrectly or dropped during transport or when attaching to or removing from the wall.

- ◆ Lifting and transporting the inverter and battery must be carried out by more than 2 people.

## 1.6 Parts List

Check the following parts list to ensure it is complete.

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



### 1.7 INVERTER TECHNICAL DATASHEET(6~12.5K)

MODEL	6048	6348	8048	10048	12548
<b>Input</b>					
Capacity (VA)	6000VA	6300VA	8000VA	10000VA	12500VA
Voltage (DC)	48V	48V	48V	48V	48V
Nominal Voltage	220VAC/110VAC				
Voltage Range	154-264VAC/77-132VAC				
Frequency	50-60Hz Auto sensing				
<b>Output</b>					
Watt	4800W	5000W	6400W	8000W	10000W
Voltage	220VAC/110VAC				
Frequency	50/60Hz				
Waveform	Pure sinewave				
Transfer time(AC to DC)	<8ms				
Transfer time(DC to AC)	<8ms				
Output voltage regulation	10%rms				
Bypass Mode	Yes				
Saver Mode	Yes				
Efficiency	>98%				
<b>Protection</b>					
Input Protection	Circuit Breaker				
Output Protection	Circuit Breaker				
<b>Battery</b>					
Battery Type	AGM-Deep Cycle,GEL				
	Up to 500Ah				
Charging current	29A	29A	39A	50A	60A
Low Level disconnect(Selectable)	48V:(40V or 42V)				
	Input AC,Output AC				
	Battery DC,Output Load				
	Alarm,Fault				
	Battery Charge Level				
	Output Frequency				
	AC Line In:Green				
	Inverter:Green				
	Charging:Yellow				
	Alarm:Red				
Battery low alarm	48V:battery light discharge 46V; battery load discharge 46V@load<20% ; 44V@load>50%/42V@load>50%;				
Battery low recovery	48V:battery light discharge 48V ; battery load discharge 48V@load<20%; 46V@load>50%/44V@load>50%;				
DC low voltage shutdown	48V:battery light discharge 44V ; battery load discharge 44V@load<20%; 42V@load>50%/40V@load>50%;				
DC high voltage alarm and fault	64V				
DC high voltage recovery	60V				
Maximum PV array power	48V:6400W				
MPPT/PWM input voltage range	48V:MPPT60-150VDC(or PWM60VDC-105VDC)				
Maximum PV array open circuit voltage	48V:MPPT150VDC(or PWM105VDC)				
Maximum solar charging current	120A				
<b>Alarm</b>					
Low battery alarm	Audible alarm-1 beeping per second				
Overload alarm	Audible alarm-continuous beeping				
Fault	Audible alarm-continuous beeping				
<b>Environment</b>					
Temperature	-10~50°C				
Humidity	C0-95 % , Non condensing				
Acoustic Noise(db)	<45dB				

### 1.8 BATTERY TECHNICAL DATASHEET

51.2V280Ah LiFePO4 Battery for Energy Storage				
Technical Parameters				
No	Item	Parameters		
1.Performance	Type	LiFePO4 battery		
	Nominal voltage	51.2V		
	Rated capacity	280Ah (0.2C/25°C) (Min:278Ah)		
	Operating voltage range	42.0V~58.0V (Typical:51.2V)		
	Charging voltage	58.0V±1.0V		
	Discharge cut-off voltage	42.0V±2.0V		
	Charging current(Max.)	200A		
	Discharge current(Max.)	200A		
	Dimensions	Length	800mm	
		Width	400mm	
		Height	255mm	
	Weight	About 105kg		
Shell	Metal/White			
2.Function	Parallel	Support		
	Communication type	CAN/RS485		
	Terminal stud	Quick connector		
	Alarm&ptection	Over Voltage, Under Voltage, Over Current, Short Circuit etc.		
3.Working Condition	Cooling mode	Automatic cold and hot		
	Altitude	≤4000m		
	Humidity	15%~85%		
	Operating temperature	Charge	0°C~50°C	
		Discharge	-10°C~60°C	
	Recommended operating temperature	Charge	15°C~40°C	
		Discharge	15°C~40°C	
Storage		-20°C~45°C		

## 1.9 Liability Limitation

Any product damage or property loss caused by the following conditions, Factory does not assume any direct or indirect liability.

- Product modified, design changed or parts replaced without Factory authorization; Changes, repair attempts and erasing of series number or seals by non Factory technician;
- System design and installation are not in compliance with standards and regulations;
- Fail to comply with the local safety regulations (VDE for DE, SAA for AU);
- Transport damage (including painting scratch caused by rubbing inside packaging during shipping). A claim should be made directly to shipping or insurance company in this case as soon as the container/packaging is unloaded and such damage is identified;
- Fail to follow any/all of the user manual, the installation guide and the maintenance regulations;
- Improper use or misuse of the device;
- Insufficient ventilation of the device;
- The maintenance procedures relating to the product have not been followed to an acceptable standard;
- Force majeure (violent or stormy weather, lightning, overvoltage, fire etc.);
- Damages caused by any external factors.

## 02 Installation

This Manual introduces the basic steps to install and set up IYP-A1/A3



### NOTE:

Please be cautious unpacking the battery, otherwise components could be damaged.

## 1. Installation Site and Environment

### General

This IYP-A1/A3 energy storage system is indoor version and can be installed in an indoor location.

When IYP-A1/A3 systems are installed in a room, IYP-A1/A3 must not be hampered by the structure of the building, the furnishings and equipment of the room.

The IYP-A1/A3 is naturally ventilated. The location should therefore be clean, dry and adequately ventilated. The mounting location must allow free access to the unit for installation and maintenance purposes, and the system panels must not be blocked.

The following locations are not allowed for installation:

habitable rooms;

ceiling cavities or wall cavities;

on roofs that are not specifically considered suitable; access / exit areas or under stairs / access walkways;

where the freezing point can be reached, such as garages, carports or other places as well as wet rooms (environmental category 2);

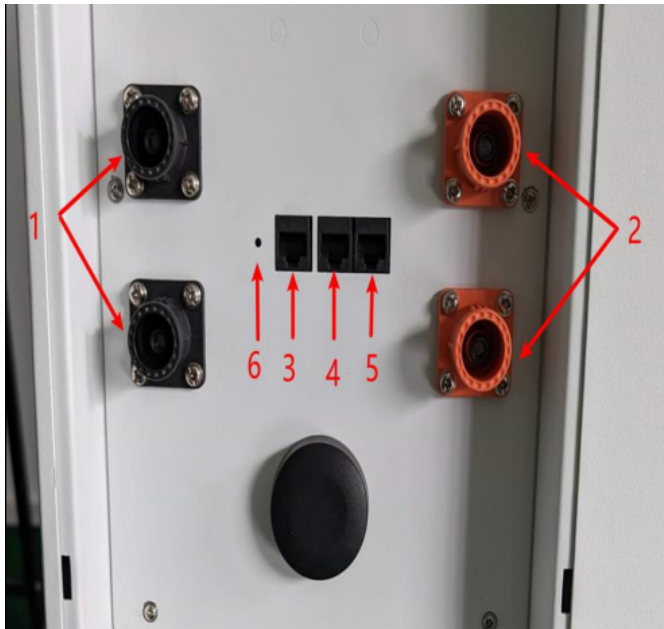
locations with humidity and condensation over 90%; places where salty and humid air can penetrate;

seismic areas - additional security measures are required; Sites with altitude below 2000m;

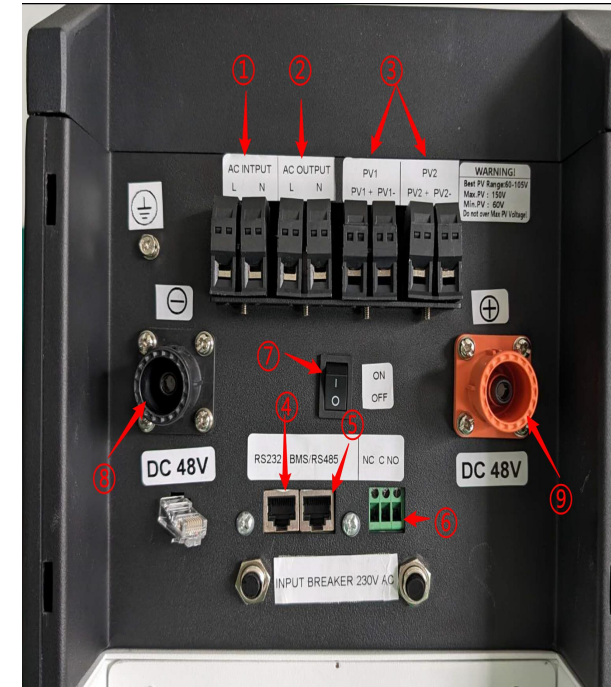
places with an explosive atmosphere;

locations with direct sunlight or a large change in the ambient temperature; places with flammable materials or gases or an explosive atmosphere.

## 2.1 Product Introduction



NO	NAME	Silk-SCREEN	REMARK
1	Negative	—	2P terminal/Black
2	Positive	+	Red/2P terminal
3	RS485 parallel port	485- 1	Parallel communication port
4	RS485 parallel port	485-2	Parallel communication port
5	COM Output port	CAN/485	Battery and inverter communication port
6	Reset button	RST	Reset the BMS



NO	NAME	Silk-SCREEN	REMARK
1	AC IN	AC IN	AC input
2	AC OUT	AC OUT	AC OUTPUT
3	PV IN	PV+ PV-	PV IN
4	RS232	RS232	/
5	RS485	RS485	Battery and inverter communication port
6	Dry Contact	/	NO/C/NC
7	SW	/	switch
8	Negative	-	Black
9	Positive	+	Red

## 2.2 Installation

**Step 1** Remove the battery and inverter from the packaging box.

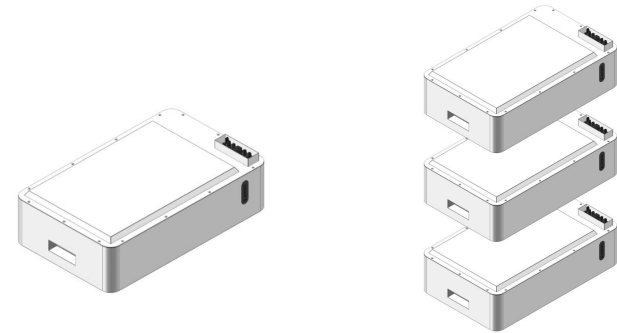


### 2.2.1 Battery Installation

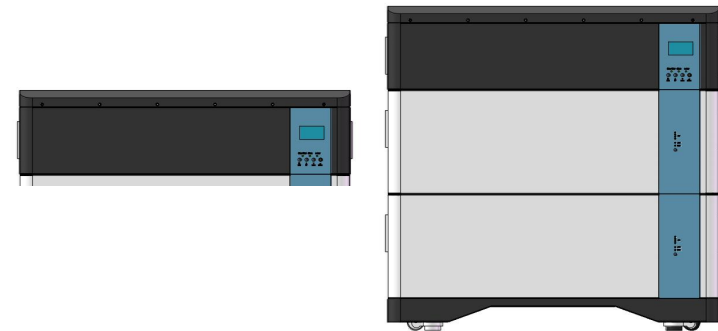
**Step 2** Fixed base, install the first battery pack module



**Step 3** After fixing base, stack each battery pack module: first module, second module and so on



**Step 4** After fixing base, place the inverter on top

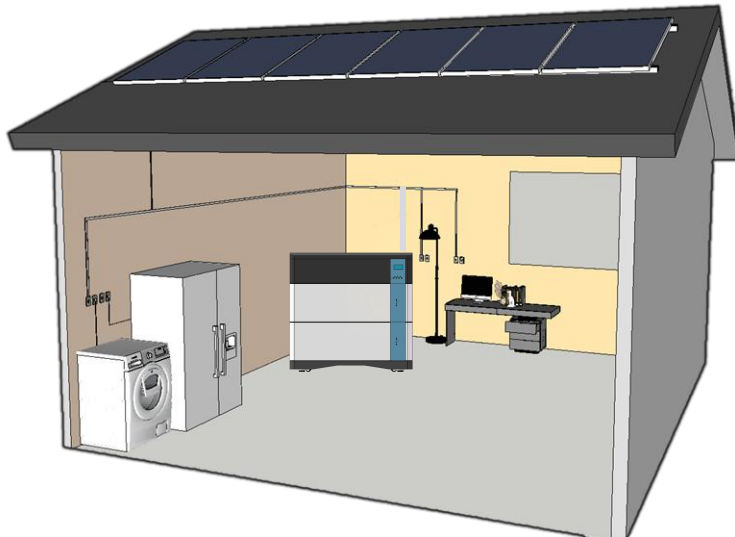




**Step 5** The connection between the inverter and the lithium battery is shown



**Step 6** Open the front cover of the last battery and remove the DIP cover. Now set the DIP switch 2 to "on" mode and close the cover again.



Household off-grid application

**NOTE:**

The DIP setting is only changed on the last battery.

If you connect more than 2 battery modules to the system, please only install the additional batteries 3-4 on the side of the system. You can connect up to 4 batteries, 2 each mounted on top of each other, to the IYP-A1/A3. To do this, carry out the individual installation steps as for the first two batteries, including the DIP setting on the last module.

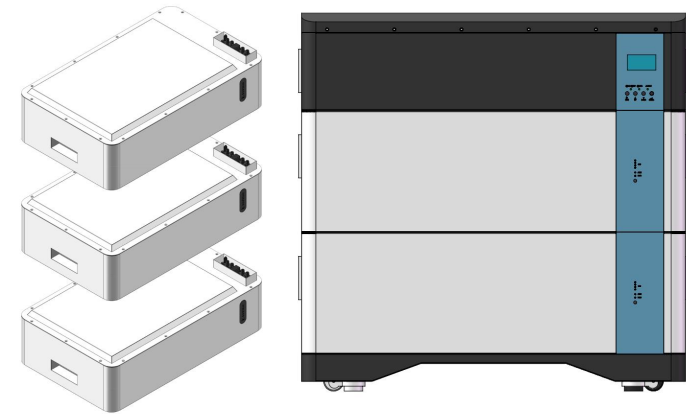


Figure 24 Increase the Battery Modules

**NOTE:**

Recommended AC circuit breaker rating is 63A.

**NOTE:**

It is necessary to disconnect the power line, communication line and communication line between battery pack and inverter to manually sleep all battery packs.

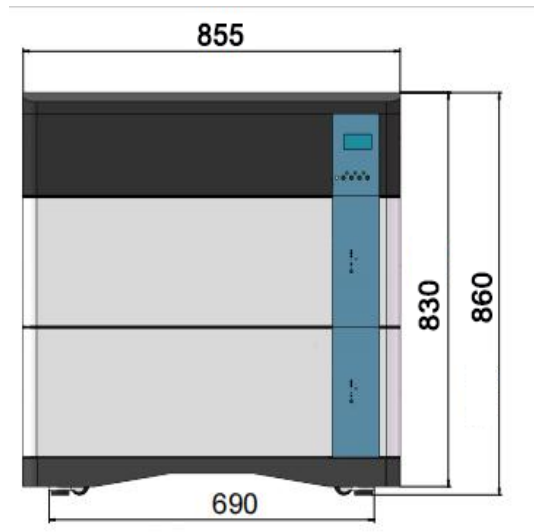
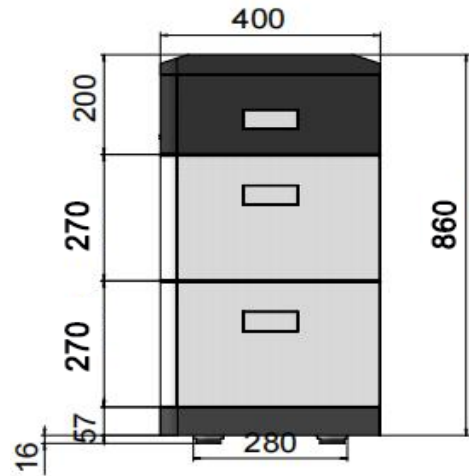
**STATEMENT:**

The method of anti-islanding protection is Method(c)



NOTE:

BESS Installation size as shown

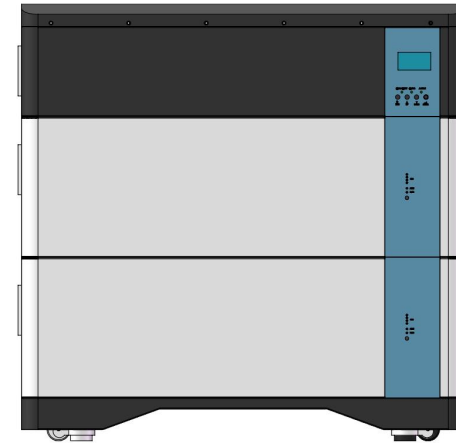


## 03 System Operation

### 3.1 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.



NOTE:

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.

### 3.2 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.

### 3.3 Emergency Procedure

When the IYP-A1/A3 energy storage system appears to be running abnormally, you can turn off the grid-connected main switch that directly feeding the BESS, and turn off all load switches within the BESS, turn off the battery switch at the same time. To prevent a potentially fatal personal injury, if you want to repair or open the machine after the power is switched off, please measure the voltage at the input terminals with a suitably calibrated voltage tester. Before working on this equipment, please confirm that there is no grid electric supply to the BESS! The upper cover plate cannot be opened until the DC-link capacitance inside the battery modules discharges completely about 15 minutes later.

#### 3.3.1 Emergency Handling Plan

1. Disconnect the AC breaker.
2. Check the control power supply. If it is OK, return the power supply to find out the reason.
3. Please record every detail related to the fault, so Factory can analyse and solve the fault. Any operation of equipment during a fault is strictly forbidden, please contact Factory as soon as possible.
4. As battery cells contain a little Oxygen inside and all cells have got explosion-proof valves, explosion hardly happens.
5. When the indicator light on the battery shows a red fault, check the fault type through the communication protocol, and contact our after-sales service personnel for advice.

#### 3.3.2 Hazards

If the battery pack leaks electrolyte, avoid contact with the leaking liquid or gas. If one is exposed to the leaked substance, immediately perform the actions described below:

**Inhalation:** Evacuate the contaminated area, and seek medical attention.

**Eye contact:** Rinse eyes with running water for 5 minutes, and seek medical attention.

**Contact with skin:** Wash the affected area thoroughly with soap and water, and seek medical attention.

**Ingestion:** Induce vomiting and seek medical attention.

### 3.3.3 Fire

If a fire breaks out in the place where the battery pack is installed, perform the following countermeasures:

#### Fire extinguishing media

During normal operation, no respirator is required. Burning batteries can not be extinguished with a regular fire extinguisher, this requires special fire extinguishers such as the Novec 1230, the FM-200 or a dioxin extinguisher. If the fire is not from a battery, normal ABC fire extinguishers can be used for extinguishing.

#### Fire -fighting instructions

1. If fire occurs when charging batteries, if it is safe to do so, disconnect the battery pack circuit breaker to shut off the power to charge.
2. If the battery pack is not on fire yet, extinguish the fire before the battery pack catches fire.
3. If the battery pack is on fire, do not try to extinguish but evacuate people immediately.



There may be a possible explosion when batteries are heated above 150°C. When the battery pack is burning, it leaks poisonous gases. Do not approach.

#### Effective ways to deal with accidents

Battery in dry environment: Place damaged battery into a segregated place and call local fire department or service engineer.

Battery in wet environment: Stay out of the water and don't touch anything if any part of the battery, inverter, or wiring is submerged.

Do not use a submerged battery again and contact the service engineer.

## 04 Ems Introduction And Set Up

### 4.1 Function Description

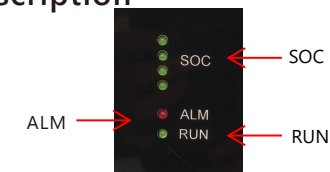
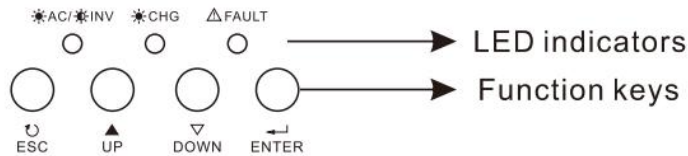


Figure 31 IYP-PACK Interface

## 4.2 LCD Operating Figure



LED Indicator		Messages	
☀️ AC/☀️ INV	Green	Solid On	Output is powered by utility in Line mode.
		Flashing	Output is powered by battery or PV in battery mode.
☀️ CHG	Yellow	Solid On	Battery is fully charged.
		Flashing	Battery is charging.
⚠️ FAULT	Red	Solid On	The inverter is in the fault warning status.

### Function Keys

Function Key	Description
ESC	To exit setting mode
UP	To go to previous selection
DOWN	To go to next selection
ENTER	To confirm the selection in setting mode or enter setting mode

## 4.3 OPERATION

### 4.3.1 AC Mode

Switch on the power button, the product is fully functional, the green LED "AC In" will light up.

### 4.3.2 Inverter Mode

When electricity off or generator power being disconnected, it will transfer to inverter mode. The transfer time is less than 10 milliseconds so that computers and other electronic equipment will continue to operate without disruption. The green LED light of "Inverter" will light up.

### 4.3.3 Charging Mode

When electricity recovery or generator power on the green LED "AC In" comes up and the orange "Charge" light starts blinking. When the batteries are fully charged, the blinking orange light changes to Solid Orange.

### 4.3.4 Alarm Mode

When battery discharge and it gets close to the battery cutoff voltage, the red "Alarm" light starts showing with a continuous beeping sound, if the electricity not recovery, it will keep this status until the battery reaches the low voltage cut-off point and shut down automatically.

### 4.3.5 Bypass Mode

The product's power button is off but the electricity or generator on, it has output to load meanwhile charging the battery. When the power button is off, if without electricity or generator off, there will be no output to load.

### 4.3.6 Saver Mode

If there is no supply of grid, the inverter's AC output will not be supplied until a load greater than 15 watts is connected to the inverter. It automatically detects the connected load every 25 seconds.

### 4.3.7 Setting Mode/Error Codes for reference

Enter setting mode, Press "ENTER" button for 10 seconds.Exit setting mode, Press "ESC" button repeatedly.

1.Press "UP" or "DOWN" button to choose the parameter and then press "ENTER" button.

2.When parameter is flashing, press "UP" or "DOWN" to change it and then press "ENTER" button to confirm.

When setting: Setting icon is flashing

Setting succeed: Left-sided frame of the parameter will flash

Setting failed: FAULT light on

Settings	Display (Left)	Display (Mid)	Display (Right)	Setting range	Descriptions
Mains input voltage range	Alr	00	UPS	Narrow range	Mains input range is 180-265V
			APL	Wide range	Mains input range is 155-265V
Mains frequency oltage range	AFr	01	LO	Narrow range	Mains input frequency range is 45-65HZ
			HI	Wide range	Mains input frequency range is 40-70HZ
Working mode	None	02	UTI	Mains priority	The utility power will provide power to the load first. Only when the utility power is not enough to supply the load, the solar energy And the battery will provide power to the load.
			SOL	Solar priority	When solar energy is sufficient, solar energy will be preferentially provided to the load. When there is solar energy but not enough, the solar energy and battery power will provide power to the load at the same time. When there is no solar power, the utility will provide power to the load. At the same time, if the battery voltage drops to the low-battery warning voltage point or the set DC-to-AC voltage point, the mains will also provide power to the load.
			SBU	Battery priority	When solar energy is sufficient, solar energy will be preferentially provided to the load. When there is solar energy but not enough, the solar energy and battery power will provide power to the load at the same time. If the battery voltage drops to the low battery warning voltage point or the set DC to AC voltage point, the mains will provide power to the load.
Charging mode	None	03	CUT	Mains priority	The energy of the mains and the solar energy charge the battery at the same time
			CSO	Solar priority	In the solar priority mode, when the PV meets the requirements, the battery is charged with solar energy preferentially, and when the battery voltage is too low, the mains charge will be started
			OSO	Solar charging only	The machine simply uses the energy of solar energy to charge the battery
Mains charging current ratio	ACP	04	100%	10~100%	Adjustable charging current ratio of mains
Solar charging current ratio	SCP	05	100%	20~100%	You can adjust the charging current proportional solar

Settings	Display (Left)	Display (Mid)	Display (Right)	Setting range	Descriptions
Boost charging voltage	CU	06	14.2V	13.5~15.0V	Bulk charging voltage setting, according to different types of batteries
			28.4V	27.0~30.0V	
			56.8V	54.0~60.0V	
Float charging voltage	FLU	07	13.6V	12.5~14.0V	Float voltage setting, according to different types of batteries
			27.2V	25.0~28.0V	
			54.4V	50.0~56.0V	
Battery lockdown voltage	COU	08	10.2V	9.5~11.5V	Set the shutdown voltage point of battery protection voltage
			20.4V	19.0~23.0V	
			40.8V	38.0~46.0V	
Charging voltage of mains recovery	DTA	09	12.0V	11.5~12.5V	Set the battery voltage point when the mains power is involved in the solar energy priority charging mode
			24.0V	23.0~25.0V	
			48.0V	46.0~50.0V	
Charging voltage of mains off	ATD	10	13.5V	13.0~14.0V	Select the voltage point of converting from mains to solar power in solar priority mode
			27.0V	26.0~28.0V	
			54.0V	52.0~56.0V	
Inv. output voltage	OU	11	220V	200~240V	Set the inverter output voltage
Mains detection speed	CST	12	HI	High speed	Mains sensitivity settings: high medium low
			IDE	Mid. speed	
			LO	Low speed	
Inv. output frequency	OF	13	50Hz		Set inverter output frequency
			60Hz		
Fault restart switch	RA	14	TE	On	Restart 3 times after short circuit or overload
			TD	Off	No restart after short circuit or overload
Backlight control	BLC	15	LON	Always on	The display backlight is always on
			LOF	Always off	The display backlight is always off
			LOD	Delay off	Display backlight smart switch
Buzzer control switch	BEC	16	AON	On	Allows beeping in fault state
			AOF	Off	No beeping in any state
Low battery alarm switch	BOL	17	OFF	Off	Intelligent battery protection function, it is not recommended to change
			ON	On	
Load limit	LL	18	OFF	Off	Intelligent transformer temperature protection function, it is not recommended to change
			ON	On	
Load alarm limit	LEL	19	OFF	Off	This setting does not adapt to this inverter. Setting not available.
			ON	On	
Baud rate	BAU	20	0	2400	Set the communication baud rate
			1	4800	
			2	9600	
Output display mode	ODT	21	220V	220V	Set display output voltage
			110V	110V	
Swon bat voltage	BLS	22	11.5V	10.5~12.2V	After the machine is shut down abnormally, the battery voltage must be higher than the set value before it can be turned on normally
			23.0V	21~24.4V	
			46.0V	42~48.8V	

Settings	Display (Left)	Display (Mid)	Display (Right)	Setting range	Descriptions
Bat low off restart vol	BRU	23	13.0V	12.0~14.0V	After the machine is shut down abnormally, the battery voltage must be higher than the set value before it can be turned on normally
			26.0V	24.0~28.0V	
			52.0V	48.0~56.0V	
Battery type	BTT	24	SEL	SEL	Sealed Lead Acid Battery
			GEL	GEL	Gel Battery
			FLD	FLD	Inter Cell
			USER	USER	Customer Customization
			TER	LiCoMnNiO2	Ternary Lithium Battery
			LIF	BAT-LiFePO4	Lithium Iron Phosphate Battery
BMS Function Switch	BnS	25	OFF	On	Whether to enable the BMS communication function
				Off	
Bat Soc Under Lock	BSU	26	10%	5~50%	BMS low voltage SOC value, if the BMS SOC value is lower than the set value, the inverter will shut down to protect the battery
Bat Soc Turn To Ac	STG	27	20%	5~50%	When the working mode of the inverter is set to the battery priority mode, the inverter will be forced to enter the mains charging when the SOC of the BMS is lower than the set value.
Bat Soc Turn To Dc	STB	28	95%	50~100%	When the working mode of the inverter is set to the battery priority mode, the inverter resumes the DC working mode when the SOC of the BMS is higher than the set value.
Bat Restart Soc	BSR	29	50%	30~100%	When the inverter is turned on, the SOC must be higher than the set value to work normally.
Factory Reset	RS	None	OFF	On	All settings are restored to factory settings
				Off	No recovery process, keep existing settings
ECO Mode	ECO	None	OFF	On	ECO mode switching
				Off	

When the BMS/485 communication interface is externally connected, as shown in the following figure:




## Communication Connection

Please use supplied communication cable to connect to inverter and PC. Please install a monitoring software on the computer.

## Dry Contact Signal

There is one dry contact (3A/250VAC) available on the rear panel. It could be used to deliver signal to external device when battery voltage reaches warning level.

Unit Status	Condition		Dry contact port: 		
			NC & C	NO & C	
Power Off	Unit is off and no output is powered.		Close	Open	
Power On	Output is powered from battery or solar.	Normal mode	Battery voltage < Low DC warning voltage	Open	Close
			Battery voltage > Float charging voltage	Close	Open
		Solar first mode	Battery voltage < Solar to AC voltage	Open	Close
			Battery voltage > AC to DC voltage	Close	Open

## Error Codes for reference

Display (Left)	Display (Right)	Details
ALA	021	Inverter communication connection failure alarm
ALA	233	Abnormal mains output alarm
ALA	236	Abnormal machine load alarm
ALA	237	Inverter overload alarm
ALA	231	Abnormal output alarm
ALA	234	High battery voltage alarm
ALA	235	Low battery voltage alarm
ALA	241	Memory chip read and write error alarm
ALA	232	Memory chip connection failure alarm
ALA	238	Inverter over temperature alarm
ALA	239	Load-causing over temperature alarm
ALA	242	Host computer software planned shutdown alarm

ALA	244	BMS other faults
ALA	245	BMS communication abnormal
ALA	246	BMS charging overcurrent
ALA	247	BMS discharge overcurrent
ALA	248	BMS High Temperature
ALA	249	BMS Low Temperature
FAL	102	Inverter overload shutdown fault
FAL	104	Abnormal output fault
FAL	105	Abnormal load fault
FAL	106	Inverter over temperature fault
FAL	135	High battery voltage fault
FAL	134	Low battery voltage fault
FAL	123	Load-causing over temperature fault
FAL	169	Current detection signal failure
FAL	161	Abnormal mains output fault
FAL	152	Temperature sensor connection failure
FAL	162	Host computer software planned shutdown failure

## 5.INSTALLATION



### 5. 1 Locating and Mounting the Inverter

The product must be installed in a dry and well-ventilated area. as close as possible to the batteries. There should be a clear space of at least 10cm for cooling.

High temperature will result following issue:

- Reduced product serving life.
- Reduced charging current.
- Reduced peak capacity, or shutdown of the inverter.

Never mount the appliance directly above the batteries. The product is suitable for wall mounting. The appliance can be mounted horizontally as well as vertically; vertical mounting is preferable. The vertical position offers optimum cooling.

After installation, keeping the air circulating inside the product. In order to minimize the losses of cable voltage, keep the suitable distance between the product and battery.

For safety purposes this product should be installed in a well ventilated place, keep it away from chemicals synthetic components curtains or other textiles, etc.

### 5.2 AC Wiring

This is a Safety Class I product (supplied with a protective grounding terminal). Uninterruptible protective grounding must be provided at the AC input and/output terminals.

**AC Wiring should be connected with following order:**

- AC INPUT (Source)
- AC OUTPUT (Load)



Fig 3:AC input/Output Connections

**AC Input:** The product has Input protection circuit breaker. This should be switched off before the wiring connection.


Remove the AC wiring compartment cover to connect AC terminal, include grounding L and N to the corresponding terminal.

**AC Output:** The product has output protection circuit breaker. It should be switched off before the wiring connection. When connect the AC OUTPUT wiring, it should be connected the corresponding terminal.

After wiring, double check and review all connections to make sure the wires are in the correct terminals and the terminals are tight.

**AC Safety Grounding:** During the AC wiring installation, AC input and output ground wires are connected to the product. The AC input ground wire must connect to the incoming ground from your AC utility source. The AC output ground wire should go to the grounding point for your applications.

### 5.3 DC Wiring:

 <b>WARNING</b>
<p><b>DO NOT connect the DC wires from the battery bank to the inverter until:</b></p> <ul style="list-style-type: none"> <li>• All AC wiring is complete,</li> <li>• The correct DC and AC protection switches are OFF</li> <li>• The correct DC voltage and polarity have been verified</li> </ul>


Depending upon the type of batteries you use in the installation (6 or 12VDC), the batteries must be wired in series, parallel, or series-parallel. The interconnecting DC wires must be sized and rated exactly the same as those used between the battery bank and the products.

To ensure the best performance from your inverter system, do not use old or untested batteries. Batteries should be of the same size, type, rating and age.

#### 5.3.1 Procedure

The battery's Ampere Hour bigger, the back up time longer, and the battery connects wire should be corresponding.

Please follow below connect the battery cables:

 <b>WARNING</b>
<ul style="list-style-type: none"> <li>• Use an insulated box spanner in order to avoid shorting the battery.</li> <li>• Avoid shorting the battery cables.</li> </ul>

Connect the battery cables: the + (red) on the left and the-(black) on the right,to the battery. Reverse polarity connection ( + to - and - to +) will cause damage to the product.(Safety fuse inside the Inverter unit can be damaged)

The DC over current device (i.e.,fuse or circuit breaker) must be placed in the positive (RED) DC cable line between the inverter's positive DC terminal and the battery's positive terminal (RED);as close to the battery as possible.

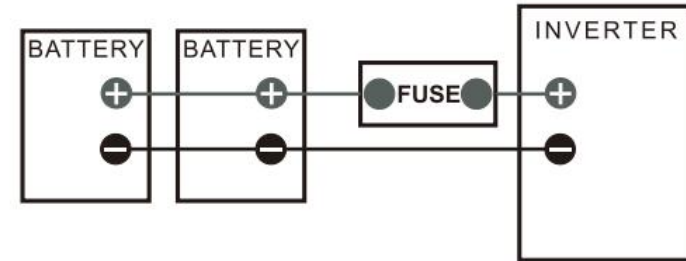


Fig 4:Inline fuse

A brief spark or arc may occur when connecting the battery cables to the inverter DC terminals; this is normal and due to the inverter's internal capacitors being charged.

All wiring to the battery terminals should be checked periodically (once a month) for proper tightening

Secure the nuts tightly in order to reduce the contact resistance as much as possible.

Be aware that over-tightening or misthreading the nuts on the DO terminals can cause the bolts to strip and snap/break off.

#### 5.3.2 DC Wiring Size

It is important to use the correct sized DC wire to achieve maximum efficiency from the system and to reduce fire hazards associated with overheating. Always keep your wire runs as short as practical to prevent low voltage shutdowns and to keep the DC breaker from nuisance tripping (or open fuses) because of increased current draw. The correct minimum DC wire size (and corresponding over current device) is required in order to reduce stress on the inverter minimize voltage drops. increase system efficiency and ensure the inverter's ability to surge heavy loads.

If the distance from the inverter to the battery bank is <5 feet. use a minimum DC wire size of #2 AWG (33.6 mm<sup>2</sup>).If the distance between the inverter and the battery is>5 feet. the DC wire will need to be increased. Longer distances cause an increase in resistance. which affects the performance of the inverter.



## 6.TROUBLESHOOTING

Proceed as follows for quick detection of common faults.DC loads must be disconnected from the batteries and the AC loads must be disconnected from the inverter before the inverter and/or battery charger is tested.

Consult your local dealer/repair center if the fault cannot be resolved.

**Note:** If the fuse is burnt due to the reverse connection of the battery or overcurrent, please remove the right fan and replace the fuse. Please make sure the power supply of the machine is completely disconnected before replacing.

Tab.III

Problem	Cause	Solution
The inverter fails to operate when switched on	Battery terminal not firm	Tighten the battery terminals.
Continuous spark from the inverter terminal	Battery terminal reversal	Check and connect the cable to the right terminal lead.
No output from inverter	Output cable terminals loosed	Open the casing and connect the output cable terminals firm to the appropriate lead.
Inverter not charging battery	input power less than(<) 150VAC	A step-up stabilizer of rating higher than the inverter should be installed.
Continuous alarm when the inverter is loaded	Overloading condition	Check the loads and disconnect heavier loads.

## Appendix

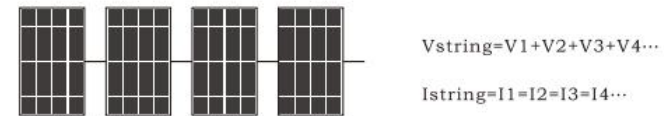
### How to choose and configure PV panels

The following parameters can be found in the specifications of each PV panel:

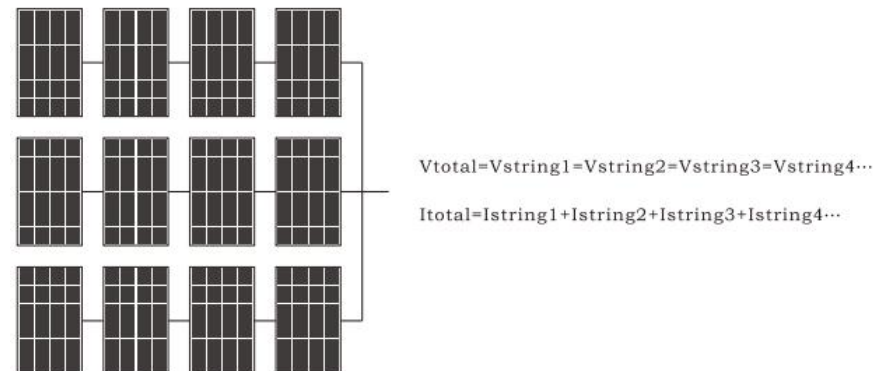
- Pmax: Maximum output power (W)
- Voc: Open circuit voltage (V)
- Isc: Short circuit current (A)
- Vpm: Rated voltage (V)
- Ipm: Rated current (A)

PV panels can be connected in series or in parallel to obtain the required output voltage and current to meet the allowable range of the solar controller.

When connecting PV panels in series, the total maximum voltage and current are:



When the PV panels that have been connected in series are connected in parallel, the total maximum voltage and current are:



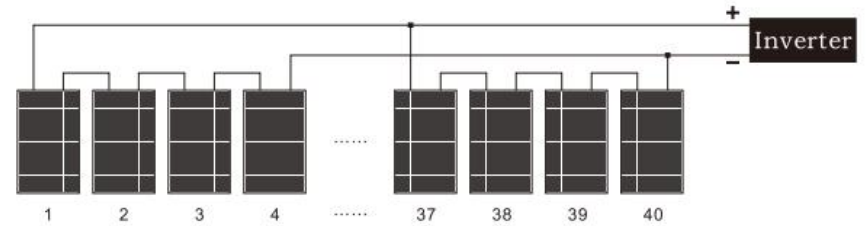
- In either case, the total output power is the power of a single PV panel × the total number of PV panels. The criteria for configuring PV panels is that the total power should be equal to or slightly greater than the maximum allowable PV power of the solar controller (please refer to the technical parameter table) . The excess capacity of PV panels does not contribute to the capacity of solar chargers and will only lead to higher installation costs.
- The total Ipm of the PV panels should be less than the maximum charging current of the inverter (60A) .
- The total Voc of the PV panel should be less than the maximum PV input voltage of the inverter (please refer to the technical parameter table).

**Example 3:** Take the 48 V inverter as an example to select the appropriate PV module. Consider that the total Voc of the PV panel cannot exceed the maximum ( PWM controller 105 V / MPPT controller 150 V ) . The total power should be equal to or slightly greater than 3200 W , we can choose the following specifications of PV panels.

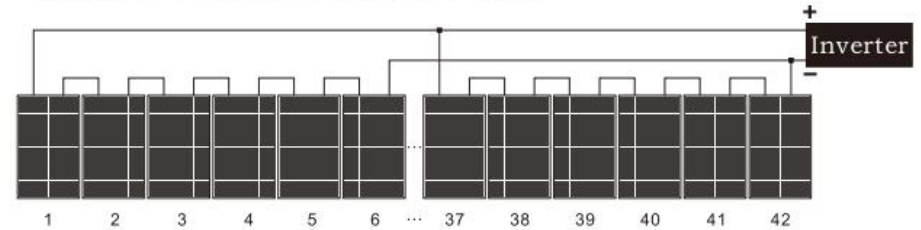
Maximum power (Pmax)	80W	The number of PV panels connected in series for each group: PWM→4 PCS (4*21.6V<105V) MPPT→6 PCS (6*21.6V<150V) Total number of PV panels: 40PCS→3200W/80W=40 (PCS) Number of groups that can be connected in parallel: PWM→10groups (40/4 = 10 groups) MPPT →7 groups (40/6 = 7 groups)
Rated voltage Vpm(V)	18V	
Rated current Ipm(A)	4.46A	
Open circuit voltage Voc(V)	21.6V	
Short circuit current Isc(A)	4.8A	

**The configuration scheme of the 48V inverter is:**

PWM controller: Every 4 PV panels are connected in series into one group, and 10 groups of PV panels are connected .



MPPT controller: Every 6 PV panels are connected in series into one group, and 7 groups of PV panels are connected (it can be connected same as PWM).



- Daily power generation of solar panels:

Power generation = total solar panel power × controller conversion efficiency × local sunshine average time

## 07 Routine Maintenance

### 7.1 Maintenance Plan

- ◆ Check if wire connections are loose.
- ◆ Check if cables are aged/damaged.
- ◆ Check if cable insulating ribbon drops.
- ◆ Check if cable terminal is loose, any overheat sign.
- ◆ Check if ground connection is good.

#### 7.1.1 Operating Environment

(Every six months)

Carefully observe whether the battery system equipment is ineffective or damaged; When the system is running, listen to any part of the system for abnormal noise; Check whether the voltage, temperature and other parameters of the battery and other equipment parameters are normal during system operation;

#### 7.1.2 Equipment Cleaning

(Every six months to one year, depending on the site environment and dust content, etc.)Ensure that the ground is clean and tidy, keep the maintenance access route unblocked,and ensure that the warning and guiding signs are clear and intact. Monitor the temperature of the battery module and clean the battery module if necessary.

#### 7.1.3 Cable, Terminal and Equipment Inspection

(Every six months to one year)

- ◆ Check if the cable connections are loose.
- ◆ Check whether the cables are aged / damaged.
- ◆ Check whether the cable tie of the cable has fallen off.
- ◆ Check if the cable terminal screws are loose and the terminal position has any signs ofoverheating.
- ◆ Check whether the management system of the system equipment, monitoring system and other related equipment are invalid or damaged.
- ◆ Check that the grounding of the equipment is good and the grounding resistance is less than 10 ohms.

### 7.2 Notes

After the equipment is out of operation, please pay attention to following notes while maintaining :

- ◆ Related safety standards and specifications should be followed in operation and maintenance.
- ◆ Disconnect all the electrical connections so that the equipment would not be powered on.
- ◆ Wait at least 5 minutes after disconnection, so that the residual voltage of the capacitors drops to a safe voltage. Use a multimeter to make sure that the equipment is completely discharged.
- ◆ The equipment should be repaired by professional staff only and it is strictly forbidden for maintenance staff to open equipment modules on their own.
- ◆ Appropriate protective measures should be taken while maintaining, such as insulated gloves, shoes, and anti-noise ear plugs.
- ◆ Life is priceless. Make sure no one would get hurt first.
- ◆ In case of a deep discharge, the battery must be charged to a SOC rate of 30% to 50% if the entire system is static (ie the battery has not been charged for two weeks or more).

Please contact us in time if there are any conditions that could not be explained in the manual.

## 08 Quality Assurance

When product faults occur during the warranty period, Factory or his partner will provide free service or replace the product with a new one.

### Evidence

During the warranty period, the customer shall provide the product purchase invoice and date. In addition, the trademark on the product shall be undamaged and legible. Otherwise, Factory has the right to refuse to honor the quality guarantee.

### Conditions

- After replacement, unqualified products shall be processed by Factory.
- The customer shall give Factory or his partner a reasonable period to repair the faulty device.

### Exclusion of Liability

In the following circumstances, Factory has the right to refuse to honor the quality guarantee: