PYLONTECH



For FHM-5K/8K-HY-1P Inverter with Force H3 Battery System User Manual

Information Version: 1.3

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About This Manual

Purpose

This manual describes FHM-5K/8K-HY-1P single-phase high-voltage hybrid inverters (hereinafter referred to as the inverter) with Force H3 battery system in terms of assembly, installation, electrical connection, debugging, maintenance and troubleshooting.

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Target Groups

This manual is applicable to electrical installers with professional qualifications and end-users, who should have the following skills:

1. Training for installation and commissioning of the electrical system, as well as dealing with hazards.
2. Knowledge of the manual and other related documents.
3. Knowledge of the local regulations and directives.

Explanation of Symbols

Symbol	Description
	**Danger**: Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
	**Warning**: Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	**Caution:** Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
	**Notice**: Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.

NOTE	**Note:** Indicates additional information, emphasized contents, or important points helping you use the product better.

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1 Safety

1.1 Safety Notes

1. Before installation, please read this manual carefully and follow the instructions in this manual strictly.
2. Installers need to undergo professional training or obtain electrical related professional qualification certificates.
3. When installing, do not open the front cover of the inverter. Apart from performing work at the wiring terminal (as instructed in this manual), touching or changing components without authorization may cause injury to people, damage to inverters and annulment of the warranty.
4. All electrical installations must conform to local electrical safety standards.
5. If the inverter needs maintenance, please contact the local designated personnel for system installation and maintenance.
6. To use this inverter for power generation needs the permission of the local power supply authority.
7. The temperature of some parts of the inverter may exceed 60° C during operation. To avoid being burnt, do not touch the inverter during operation. Let it cool before touching it.
8. When exposed to sunlight, the PV array generates dangerous high DC voltage. Please operate according to our instructions, or it will result in danger to life.
9. When wiring the lithium battery terminals, please disconnect the breaker or switch of the lithium battery in case of a physical injury caused by the high voltage.

1.2 Statement

Pylontech has the right not to undertake quality assurance in any of the following circumstances:

1. Damages caused by improper transportation.
2. Damages caused by incorrect storage, installation or use.
3. Damages caused by installation and use of equipment by non-professionals or un-trained personnel.
4. Damages caused by failure to comply with the instructions and safety warnings in this document.
5. Damages of running in an environment that does not meet the requirements stated in this document.
6. Damages caused by operation beyond the parameters specified in applicable technical

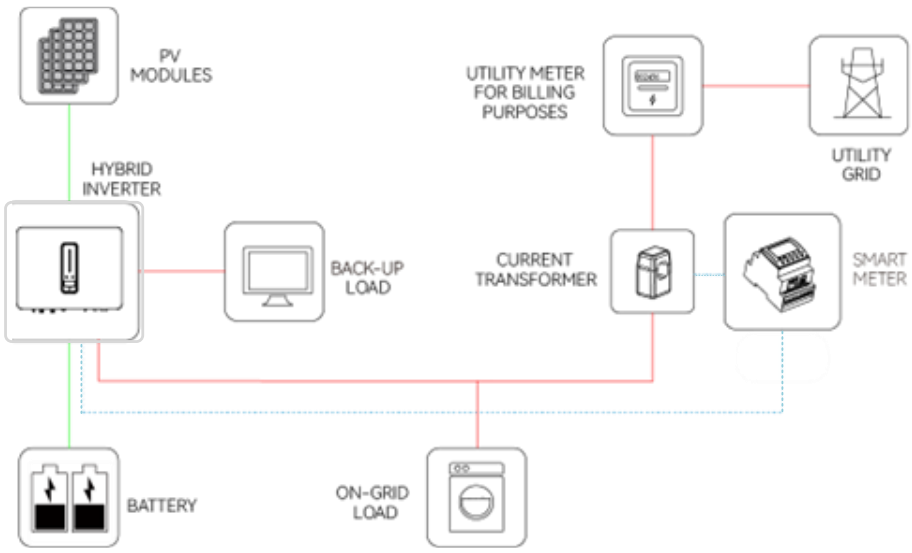
specifications.

7. Damages caused by unauthorized disassembly, alteration of products or modification of software codes.
8. Damages caused by abnormal natural environment (force majeure, such as lightning, earthquake, fire, storm, etc.).
9. Any damages caused by the process of installation and operation which don't follow the local standards and regulations.
10. Products beyond the warranty period.

2 Product Description

2.1 System Introduction

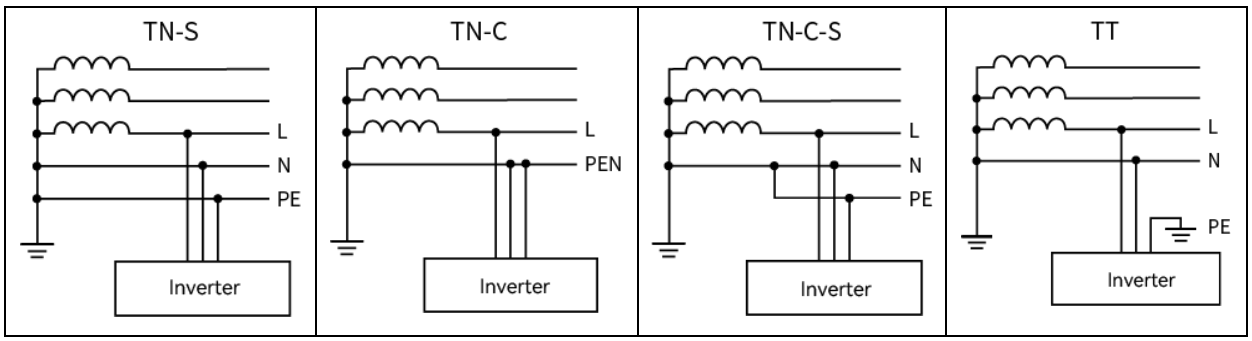
The hybrid solar system is usually composed of the PV array, hybrid inverter, Force H3 battery system, loads and power grid.



NOTICE

Notice: The system is not suitable for supplying life-sustaining medical devices. It cannot guarantee backup power in all circumstances.

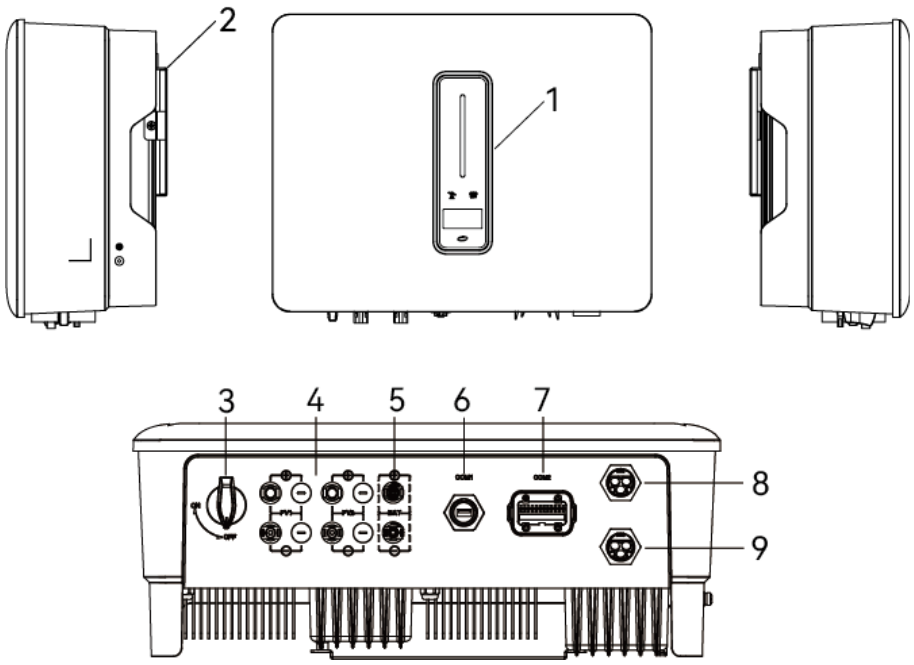
The applicable grid types for the inverter are TN-S, TN-C, TN-C-S and TT. When applied to the TT grid, the voltage of N to PE suggests less than 30V.



2.2 Product Introduction

The inverter is also known as hybrid inverter or storage inverter, which is mainly used to combine the PV array, Force H3 battery system, loads and power grid to realize intelligent power management and dispatching.

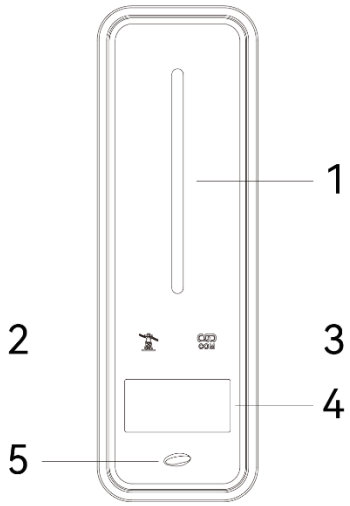
2.2.1 Appearance



Wiring terminals are at the bottom of the inverter, as shown in the table below.

Item	Terminal	Note
1	Display and LED panel	Display the operation information and working status of the inverter.
2	Hanger	Used to hang the inverter on the wall-mounting bracket.
3	DC switch	Used to safely disconnect the DC circuit.
4	DC input terminal	PV connector
5	Battery input terminal	Battery connector
6	COM1 port	Wi-Fi/LAN/4G module connector
7	COM2 port	Multi-function Connector (Meter/BMS/RS485/DRED)
8	On-grid output terminal	Used for On-grid output cable connection
9	Back-up output terminal	Used for Back-up output cable connection

2.2.2 Indicator



Item	Indicator	Status		Description
1	Power and Alarm Indicator	Off		No power.
		Blue	Quick flashing	Inverter entered self-test status.
			Slow flashing	Inverter entered waiting status.
			Breathe flashing	Inverter works normal.
		Orange	Breathe flashing	Low battery warning, the battery power is about to reach the SOC protection value.
		Red	Always on	An alarm or fault is detected, view the fault info on the display.
2	Grid Indicator	Off	Grid lost.	
		Slow flashing	Inverter detected grid but not running in on-grid mode.	
		Always on	Inverter works in on-grid mode	
3	Communication Indicator	Green	Always on	The inverter communication is running normally.
		Green	Flashing	The inverter communicates with EMS or Master inverter through

				RS485 or CAN.
		Orange	Always on	The inverter isn't communicating with smart meter.
		Red	Always on	The inverter isn't communicating with the BMS.
4	Display	Display off to save power, press the button to wake up the display.		
5	Button	Switch display information and set parameters by short press or long press.		

2.3 Symbols on the Inverter

Symbol	Description
	To avoid the potential effects on the environment and human health as a result of the presence of hazardous substances in electrical and electronic equipment, end-users of electrical and electronic equipment should understand the meaning of the crossed-out wheeled bin symbol. Do not dispose of WEEE as unsorted municipal waste and have to collect such WEEE separately.
	Please read the instructions carefully before installation.
	Do not touch any internal parts of the inverter within 10 minutes of disconnecting the power, battery and PV input.
	CE mark, the inverter complies with the requirements of the applicable CE guidelines.
	Danger. Risk of electric shock!
	The surface is hot during operation and do not touch.
	Additional grounding point.
	TÜV mark of conformity.

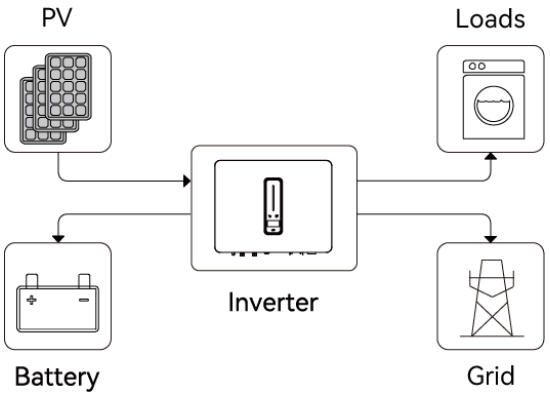
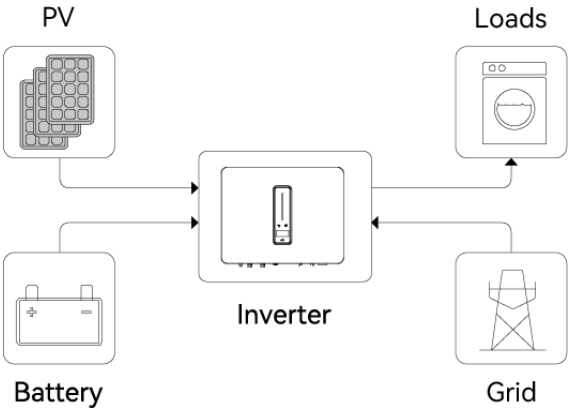
2.4 Operation Modes

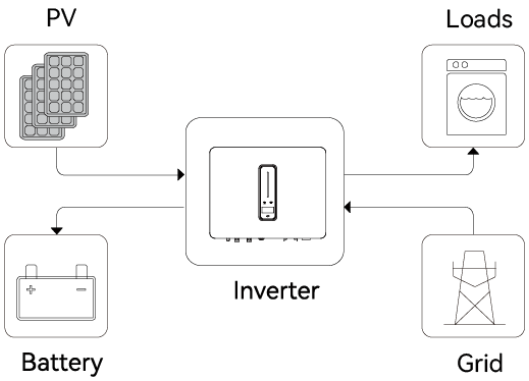
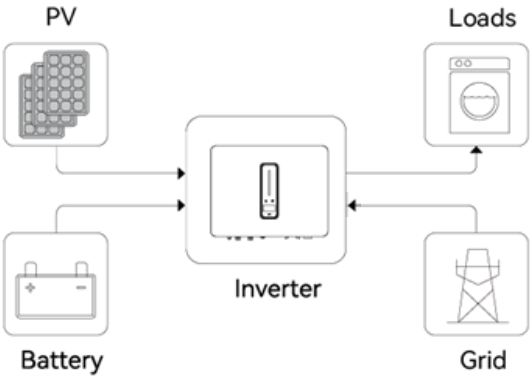
Hybrid inverter has the following basic operation modes:

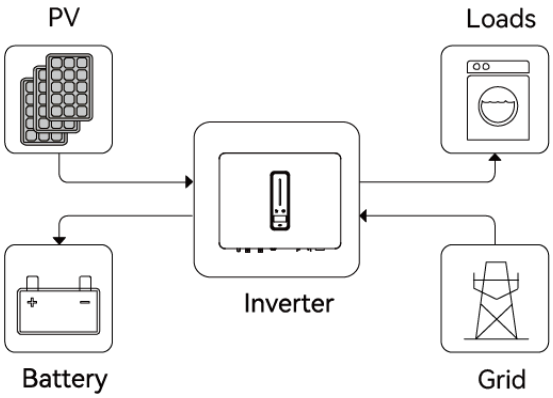
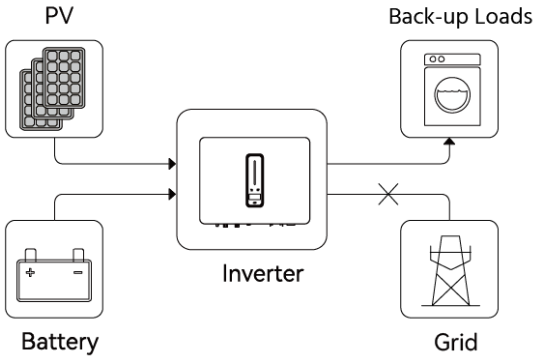
General Mode, Economic Mode, UPS Mode, Peak Shifting, Feed-in Mode, Off-grid Mode, ToU Mode.

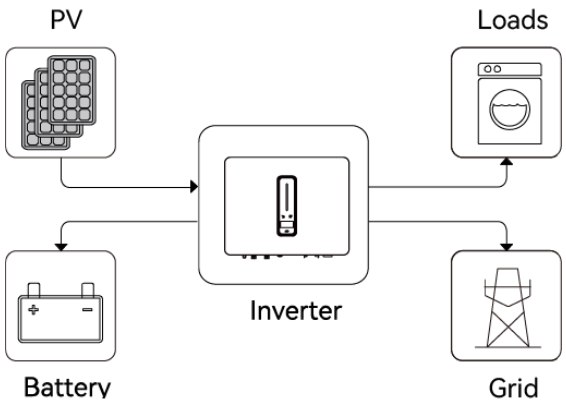
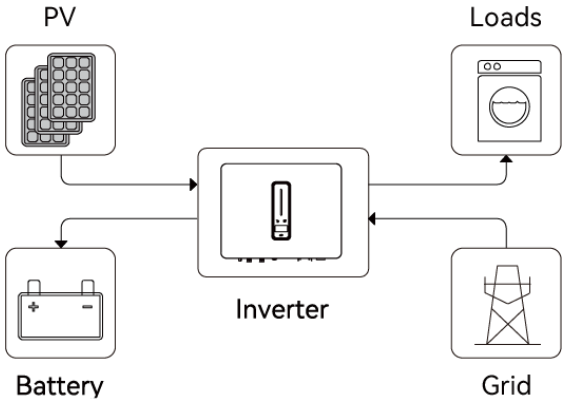
Users can set the operation mode through the inverter display menu, monitoring web and monitoring App.

In General Mode, Economic Mode, Peak Shifting, Feed-in Mode, UPS Mode and ToU Mode, when the power grid fails, the inverter will automatically switch to Off-grid Mode provided that On/Off-grid switch is turned on, supplying power to Back-up side loads without changing operation mode.

<table>
<tr><th colspan="2">General Mode</th></tr>
<tr><td>In this operation mode, when the PV power is sufficient, it will be dispatched in the following sequence: loads first, the battery second, and the grid last. (You can set the export power to the grid to 0W when the local grid doesn't allow inverter power to feed to the grid).
PV→Loads→Battery→Grid</td><td>
</td></tr>
<tr><td>When the PV power is insufficient, the battery will discharge to supply loads, and the grid will join in if the battery is not enough to supply loads (or the battery reaches the End SOC).
PV + Battery (+Grid) ➞ Loads</td><td>
</td></tr>
</table>

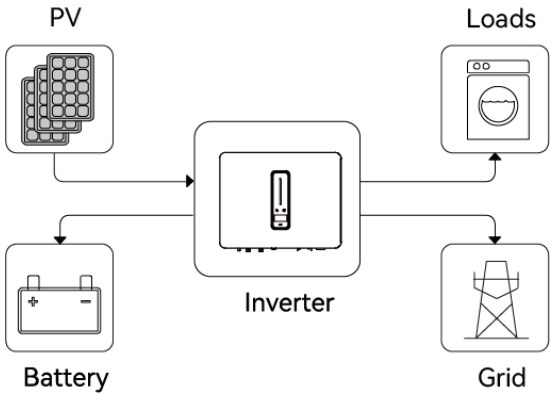
Economic Mode	
In this working mode, you can set charge/discharge power and time in the App, inverter will use the power from PV or grid (whether to use can be set in the App) to charge the battery in the predetermined period.	
Inverter will use power from PV and battery to supply loads in the predetermined period and the insufficient part will be supplied by the grid.	

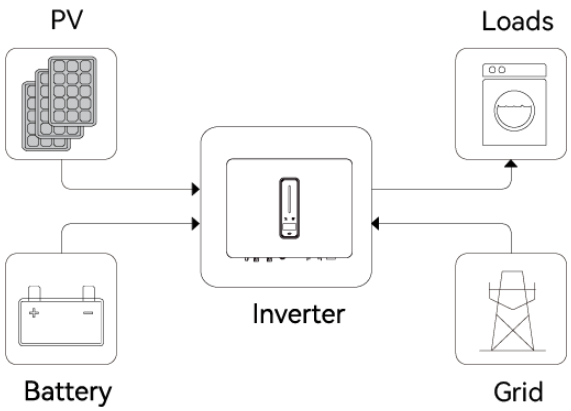
UPS Mode	
In this operation mode, the inverter will use power from the PV and the grid to charge the battery until it is fully charged, and any excess power will supply the loads. The battery will not discharge as long as the grid is available. PV(+Grid)➞Battery	
When the grid fails, power from PV and battery will supply loads connected on the back-up side. PV(+Battery)➞Back-up Loads	

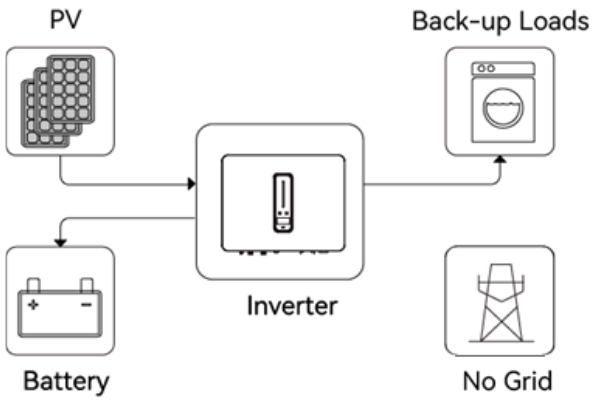
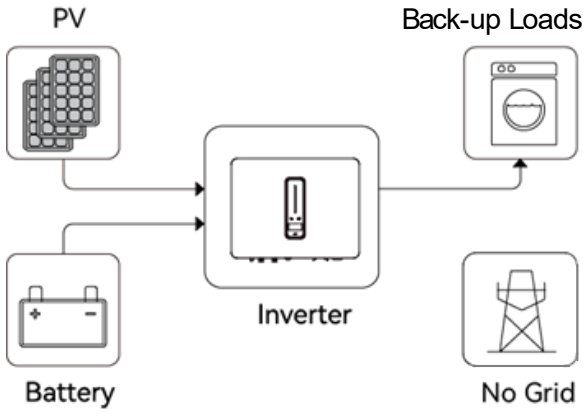
Peak Shifting	
EXPmax(kVA): Expected Max. import power from the utility grid. PV generation supply priority: PV powers load, battery and utility grid sequentially	
EXPmax(kVA): Expected Max. import power from the utility grid. Load consumption priority: PV, utility grid (EXPmax) and battery sequentially. Battery will be charged if there is surplus power from PV and/or utility grid.	

⚠CAUTION

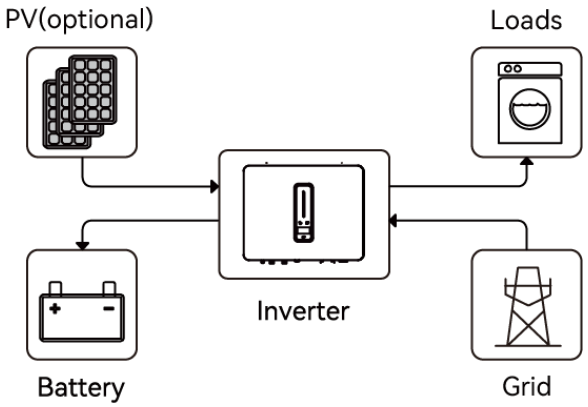
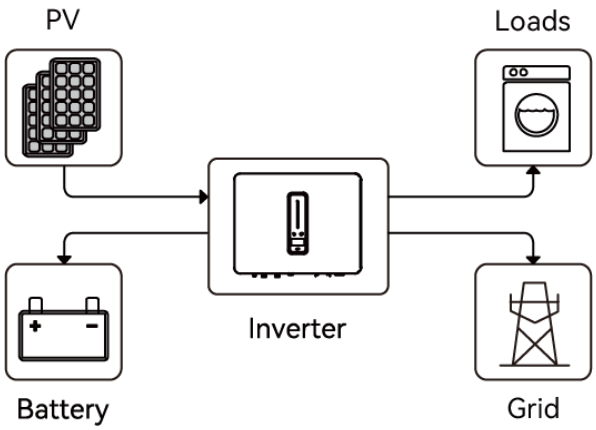
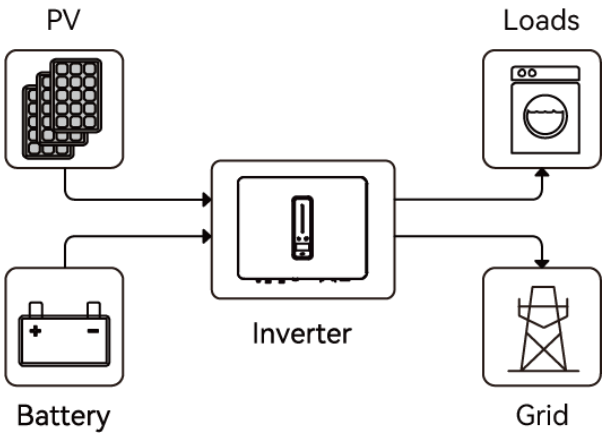
Caution: To realize the "Peak Shifting" function, the load power that exceeded Pmax has to be within the inverter max output power, otherwise, the inverter will only output the max power which allowed.

Feed-in Mode	
When the PV power is sufficient, it will be dispatched in the following sequence: loads first, the grid second, and the battery last. PV→Loads→Grid→Battery	

When the PV power is insufficient, the PV and the battery will supply loads together. When the battery power is insufficient(or the battery reaches the End SOC), the grid will join together to supply loads. PV + Battery(+Grid)➞Loads	

Off-grid Mode	
In the off-grid mode, when the PV power is sufficient, it will supply the back-up loads first and then charge the battery if there's surplus power. PV➞Back-up Loads➞Battery	
When the power from PV is insufficient, the battery will discharge to supply back-up loads together with PV. PV + Battery➞Back-up Loads	

ToU Mode
Users can set different operation modes within a time group. The modes available for setting within a Time of Use (ToU) time group include General Mode, Battery Charge, PV Charging, Peak Shifting, Feed-in Mode, and Battery Discharge. Among these, General Mode, Peak Shifting, and Feed-in Mode are consistent with the aforementioned working logic.

Battery Charge: This mode allows both the PV and the grid to charge the battery, with the option to set a charging power limit and the end charging SOC.	
PV Charging: This mode only allows the PV to charge the battery, with the option to set a charging power limit and the end charging SOC.	
Battery Discharge: This mode allows to set a discharging power limit and the end discharging SOC.	

2.5 Back-Up and Off-Grid Output

NOTICE

Notice: It cannot be used as a substitute for a conventional UPS.

NOTICE

Notice: This product cannot be used in medical devices directly related to life.

NOTICE

Notice: Equipment or precision instruments that may fail or be damaged due to power outages or power fluctuations.

Normally, the Back-Up switching time is less than 10ms. However, some external factors may cause the system to fail on switching to Back-Up mode. Therefore, the conditions for using the Back-Up function smoothly are as follows for your awareness.

1. Do not connect loads that are dependent on a stable energy supply for a reliable operation.
2. Do not connect the loads whose total capacity is greater than the maximum Back-Up capacity.
3. Do not connect the loads that may cause very high start-up current surges, such as non-frequency conversion air conditioning, vacuum cleaner or half-wave loads such as hair dryer, heat gun, hammer drill.
4. Due to the condition of the battery itself, battery current might be limited by some factors, including but not limited to the temperature and weather.

The inverter will restart in case of overload protection. The time required for restarting will increase (5 min at most) if overload protection repeats. Try to reduce Back-Up load power within maximum limitation or remove the loads which may cause very high start-up current surges.

2.6 Unpacking and Storage

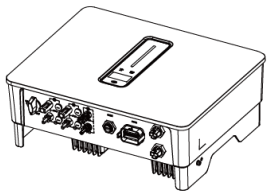
The device is thoroughly tested and strictly inspected before delivery. Nonetheless, damage may still occur during shipping. For this reason, please conduct a thorough inspection after receiving the device.

Contact Pylontech or the transport company in case of any damage or incompleteness, and provide photos to facilitate services.

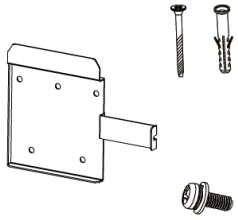
2.6.1 Packing List

The package of the inverter includes the following accessories. Please check whether the accessories in the packing box are complete when receiving the goods.

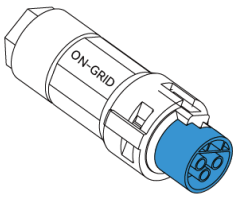
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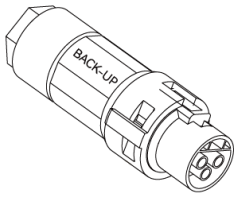
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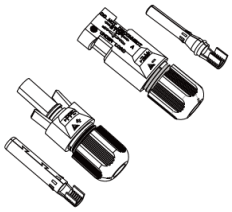
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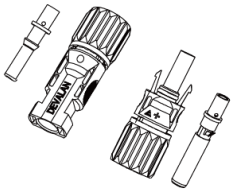
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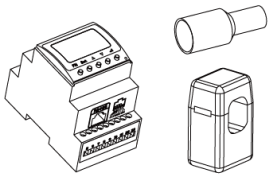
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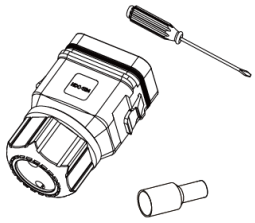
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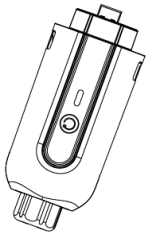
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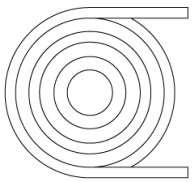
H



I



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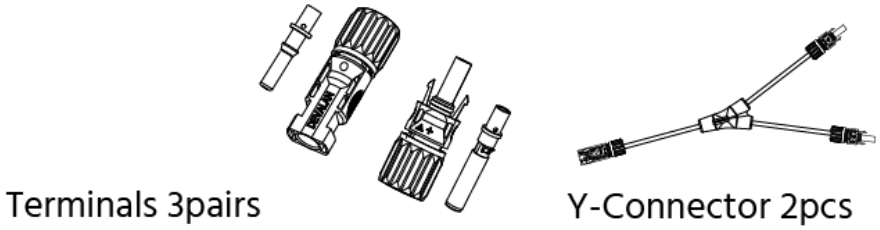
User Manual

Item	Name and Quantity	Note
A	Inverter (1pcs)	
B	Wall-mounting bracket (1pcs), Expansion plug set (5pcs), M5 screws (1pcs)	
C	On-grid connector set (1pcs)	Blue
D	Back-up connector set (1pcs)	Black

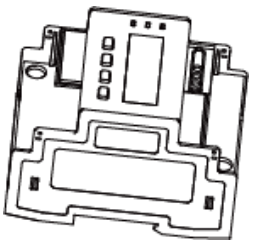
E	PV terminal (FHM-5K/8K-HY-1P 2 pairs)	Black, U-profile pin
F	Battery terminal （1 pair)	Blue, O-profile pin
G	Meter with 1 CT (1pcs)	
H	COM2 connector set (1pcs)	
I	Monitoring device (1pcs)	
J	10m meter communication cable (1pcs), 3m battery communication cable (1pcs)	
K	PE terminal(1pcs)	
L	User guide	

Optional

- FH3 Parallel Operation Harness Kit



- Three-phase Meter with 6CTs



2.6.2 Inverter Storage

1. Do not dispose of the original packing case. It is recommended to store the device in the original packing case when the device is decommissioned.
2. The storage temperature and humidity should be in the range of -30℃ and 60℃, and less than 90%, respectively.
3. If a batch of inverters needs to be stored, the height of each pile should be no more than 6 levels.

3 Installation

3.1 Location

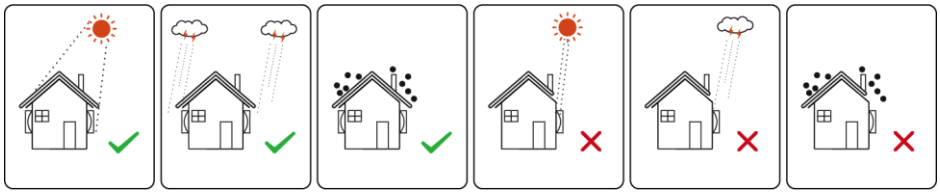
The inverters are designed with IP65 protection enclosure for in-door and outdoor installations. When selecting an inverter installation location, the following factors should be considered:

1. The wall on which the inverters mounted must be able to withstand the weight of the inverter.
2. The inverter needs to be installed in a well-ventilated environment.
3. Do not expose the inverter directly to strong sunlight to prevent excessive temperature operation. The inverter should be installed in a place with shelter to prevent direct exposure to sunlight and rain.
4. Install the inverter at eye level for easy inspection of screen data and further maintenance.
5. The ambient temperature of the inverter installation location should be between -30℃ and 60℃.
6. The surface temperature of the inverter may reach up to 75° C. To avoid risk of burns, do not touch the inverter while it's operating and inverter must be installed out of reaching of children.

3.1.1 Installation Location

Select an optimal mounting location for safe operation, long service life and expected performance.

1. The inverter with protection rating IP65 can be installed both indoors and outdoors.
2. Install the inverter at a place convenient for electrical connection, operation, and maintenance.



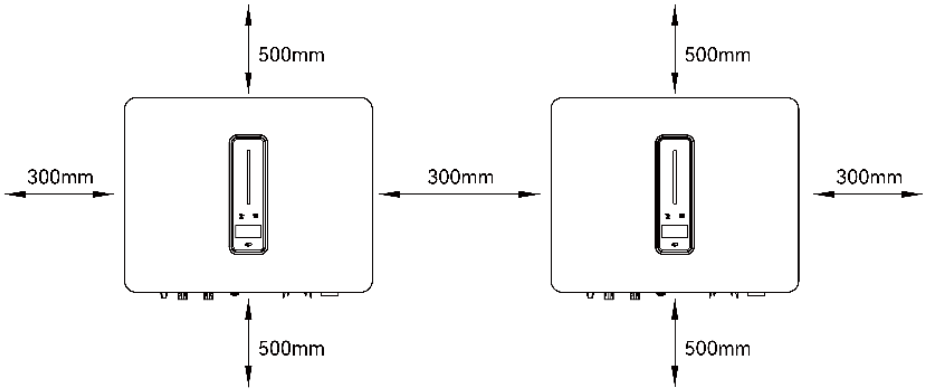
⚠ WARNING

Warning: Do not put flammable and explosive materials around the inverter.

3.1.2 Installation Spacing

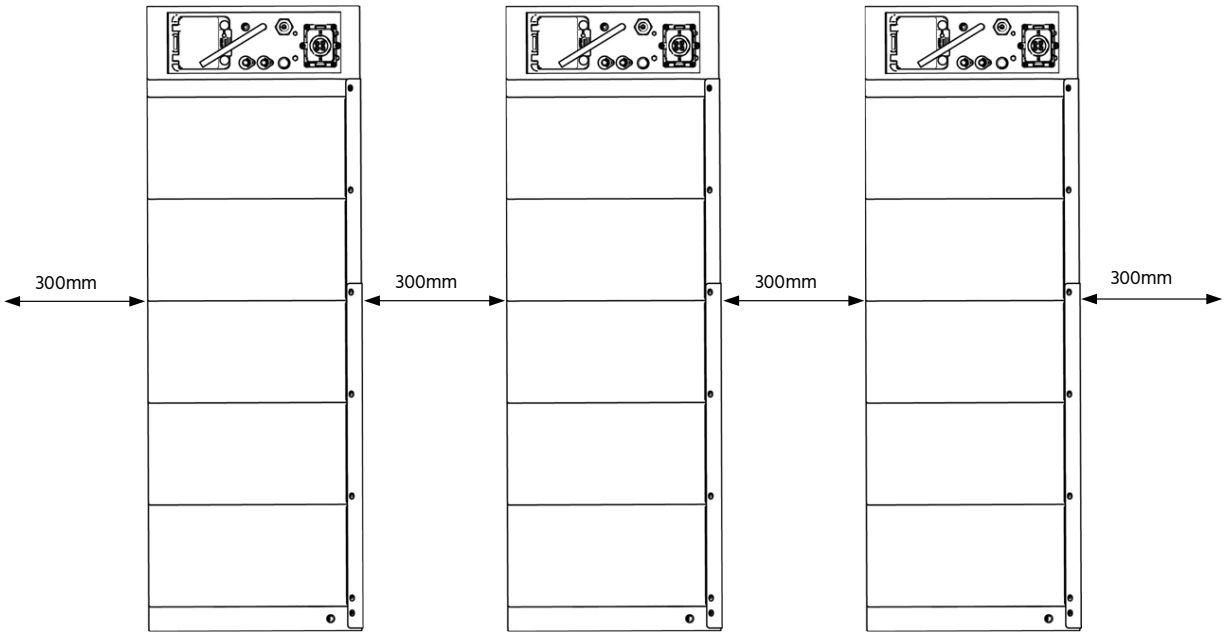
Reserve enough clearance around the inverter to ensure sufficient space for heat dissipation.

Minimum clearance between the inverter and heat source shall be more than 2 meters.



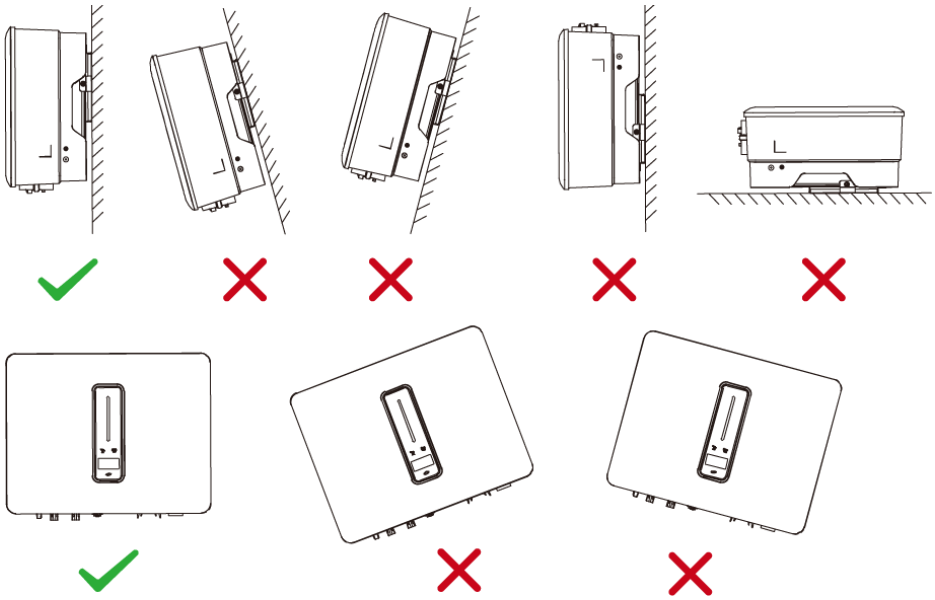
Minimum clearance between Force H3 battery strings and heat source shall be more than 2 meters.

Minimum clearance between Force H3 battery strings shall be more than 0.3 meters.



3.1.3 Installation Angle

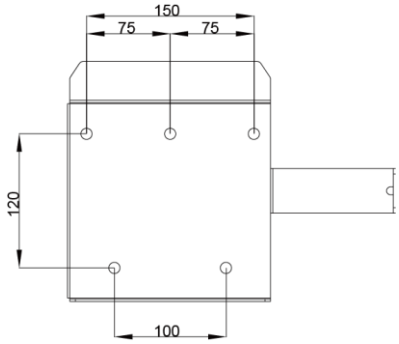
Install the inverter and Force H3 battery system vertically. Never install the system horizontally, or at forward/backward tilted, or upside down.



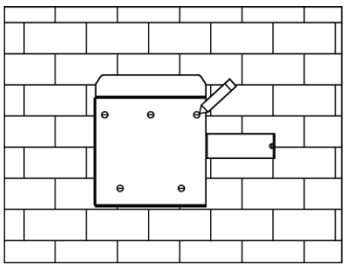
3.2 Mounting the Inverter

3.2.1 Wall Bracket Installation

Dimensions of wall bracket (mm)



1. Use the wall bracket as the template to mark the position of 5 holes on the wall.

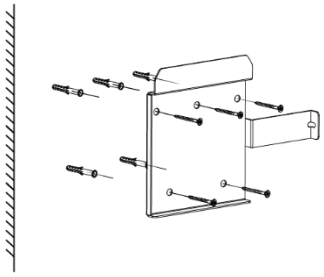


2. Use an electrical driller with 10mm diameter bit to drill 5 holes in the wall with 80mm depth.

⚠ WARNING

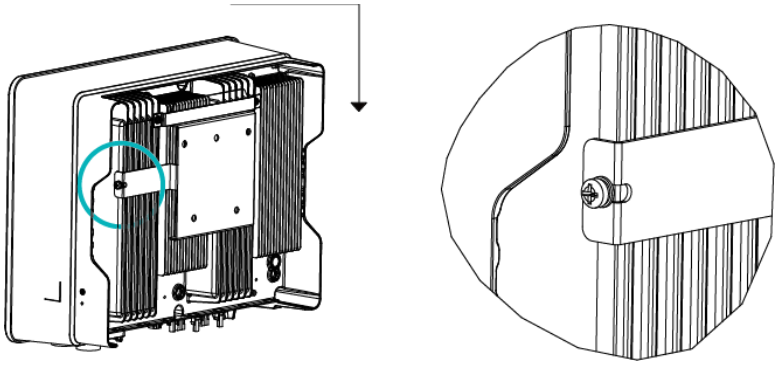
Warning: Before drilling, make sure to avoid any buried water tube and electric wires in the wall.

3. Insert the expansion tubes into the holes and tighten them, then fix the bracket onto the wall with expansion screws by using a cross screwdriver.



3.2.2 Mounting the Inverter

Lift the inverter, hang the back rail on the fixed wall bracket carefully. Secure the inverter with M5 screws.



4 Electrical Connection

DANGER

Danger: A high voltage in the conductive part of the inverter may cause an electric shock. When installing the inverter, make sure that the AC and DC sides of the inverter are completely de-energized.

DANGER

Danger: Do not connect the N-wire as a protective ground wire to the inverter casing. Otherwise, it may cause electric shock.

WARNING

Warning: Do not ground the positive or negative pole of the PV string, otherwise it will cause serious damage to the inverter.

WARNING

Warning: The inverter is not suitable for functional grounded PV arrays as mentioned in the AS/NZS 5033 standard.

WARNING

Warning: Static may cause damage to the electronic components of the inverter. Anti-static measures should be taken during installation and maintenance.

NOTICE

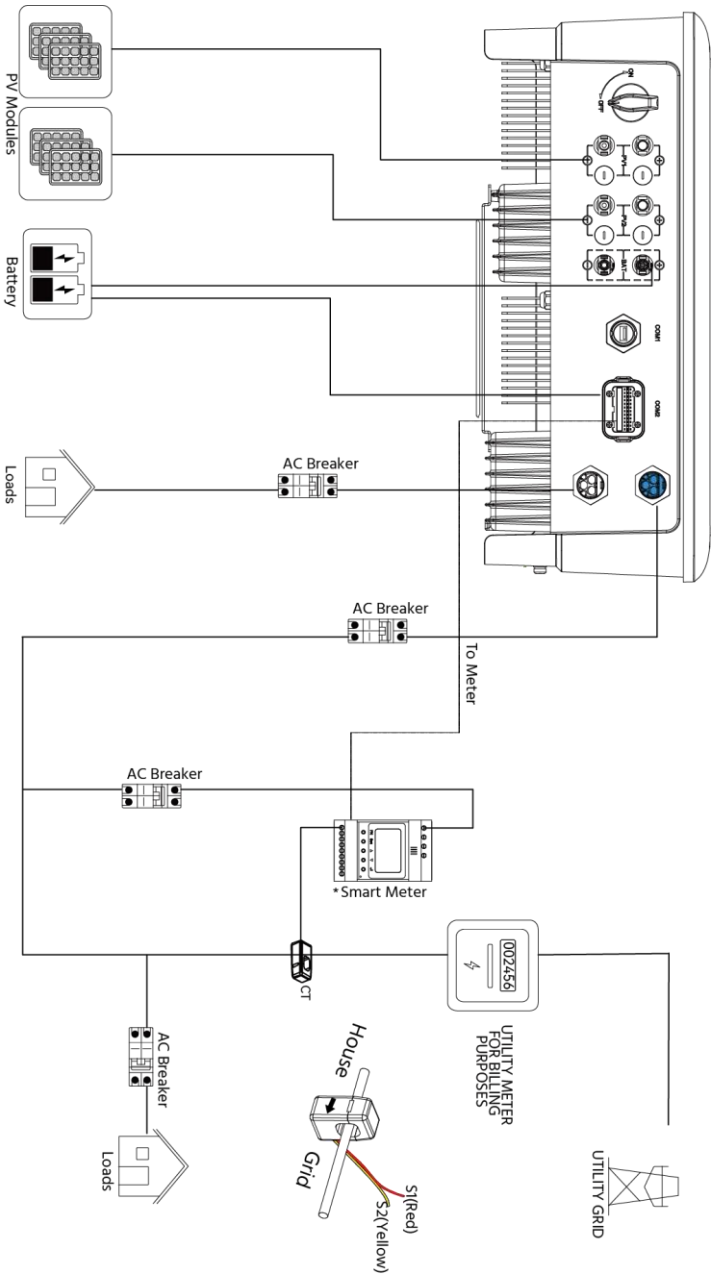
Notice: Do not use other brands or other types of terminals other than the terminals in the accessory package. Pylontech has the right to refuse all damages caused by the mixed-use of terminals.

NOTICE

Notice: Moisture and dust can damage the inverter, ensure the cable gland is securely tightened during installation. The warranty claim will be invalidated if the inverter is damaged as a result of a poorly connected cable connector.

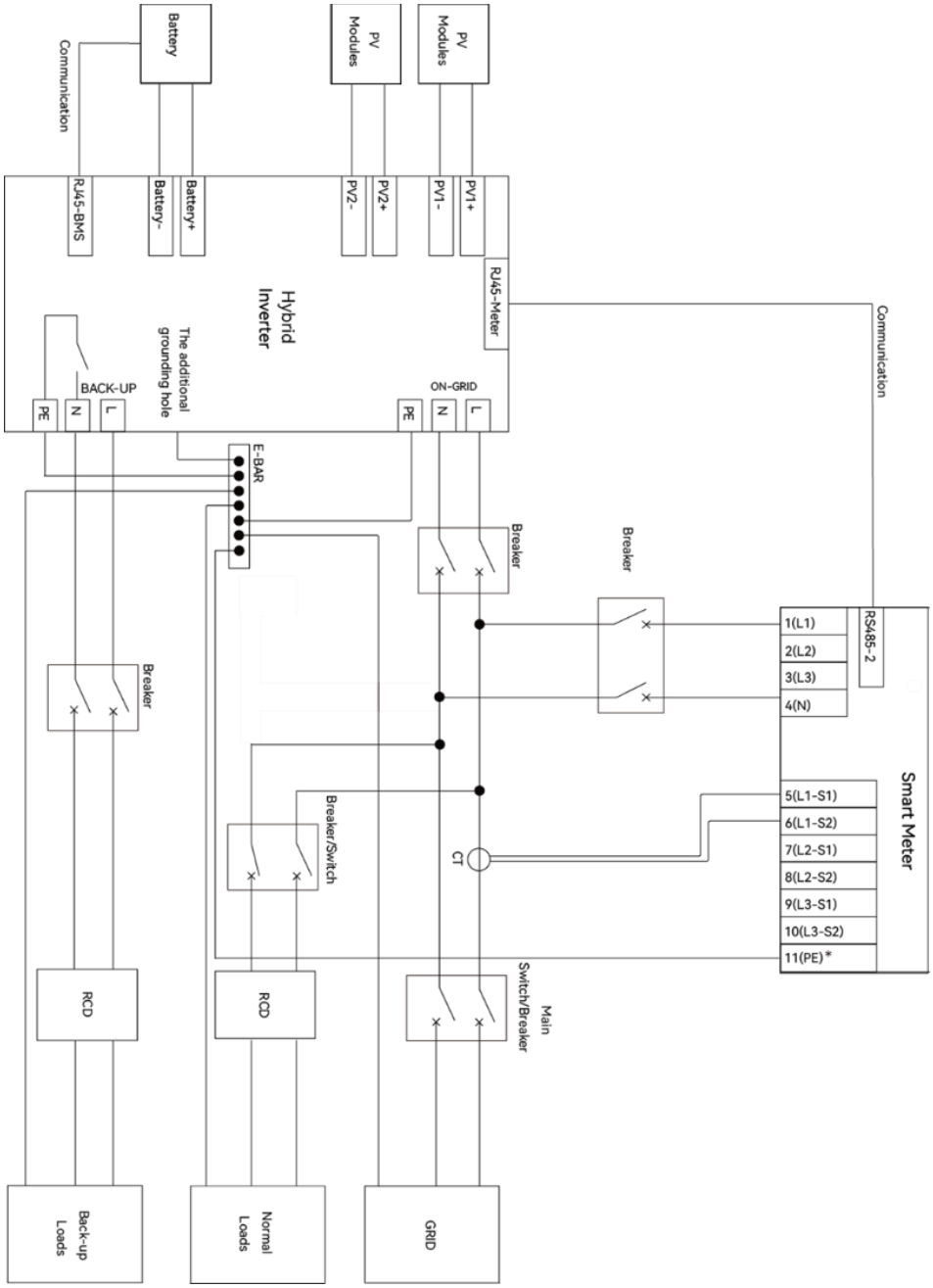
4.1 Electrical Wiring Diagram

This diagram shows hybrid inverter wiring structure and composition, concerning the real project, the installation and wiring have to be in line with the local standards. Reliability of all ground connections must be tested and valid.

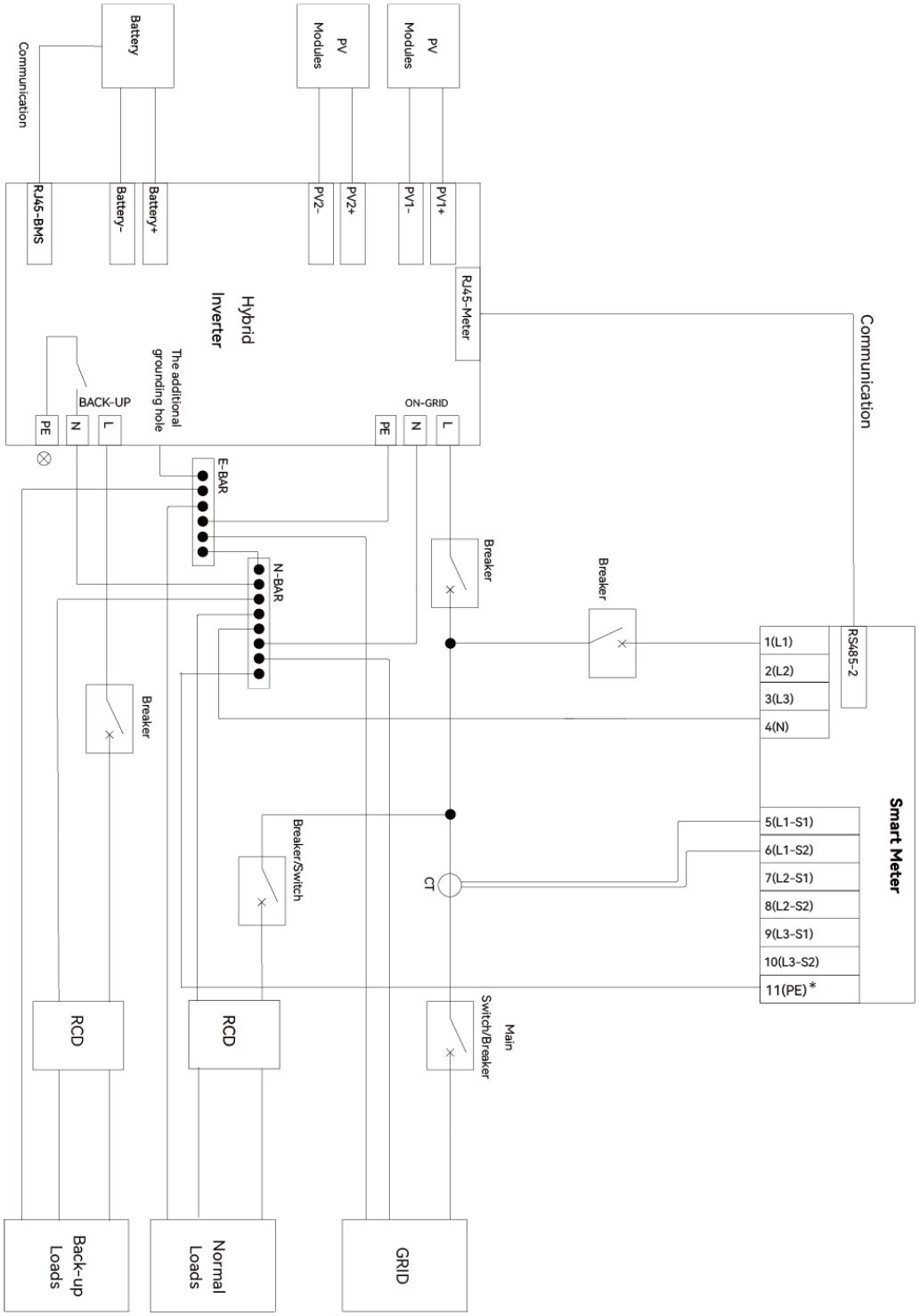


Single inverter wiring diagram

This diagram is an example without special requirement on electrical wiring connection. Neutral line of AC supply can be isolated or switched.



This diagram is an example for Australia and New Zealand. Neutral line of AC supply must not be isolated or switched, and the neutral line of GRID side and BACK-UP side must be connected together according to the wiring rules AS/NZS_3000. Pylontech is not liable for any responsibility for any consequences arising from non-compliance with this instruction.



4.2 External Ground Connection

Connect the inverter and ground bar through PE wire to achieve the purpose of grounding protection. Please always remember wiring the PE wire before wiring other wires.

⚠ DANGER

Danger: Do not connect the N-wire as a protective ground wire to the inverter casing. Otherwise, it may cause electric shock.

NOTICE

Notice: Reliable grounding is good for resisting surge voltage shock and improving EMI performance.

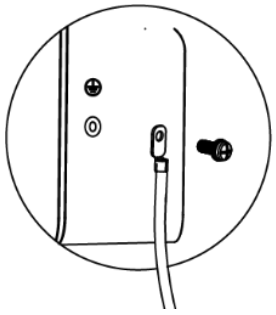
Inverters must be well-grounded.

For a system with only one inverter, just ground the PE cable.

For a multi-inverter system, all inverters PE wire need to be connected to the same grounding copper bar to ensure equipotential bonding.

Ground terminal connection steps:

1. The external grounding terminal is located at the lower right side of the inverter.
2. Fix the grounding terminal to the PE wire with a proper tool and lock the grounding terminal to the grounding hole in the lower right side of the inverter.



4.3 AC Connection

4.3.1 AC Side Requirements

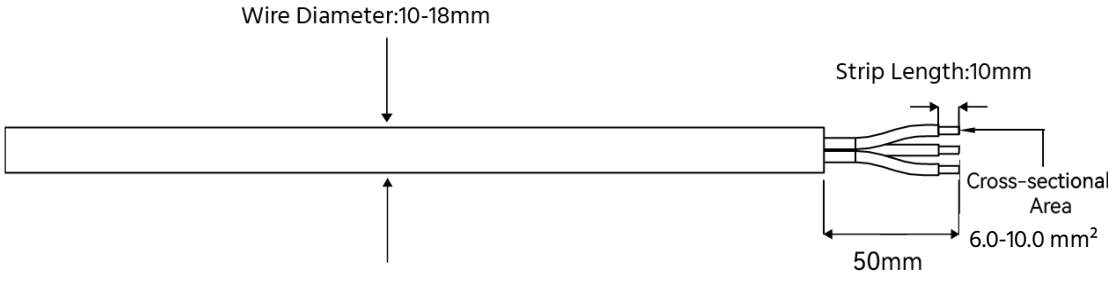
NOTICE

Notice:

1. An independent AC breaker is required in both on-grid and back-up output side, and any loads cannot be connected with inverter directly.
2. Before making the connection of AC cable, please confirm all DC & AC power source are disconnected from the inverter.
3. The single-phase high voltage hybrid inverter applies to the single-phase power grid with a voltage of 230V and a frequency of 50/60Hz.
4. Connect the inverter to the grid only after getting an approval from the local electric power company.

A single-phase AC breaker needs to be installed on the AC side of the inverter. To ensure that the inverter can safely disconnect itself from the power grid when an exception occurs, select a proper overcurrent protection device in compliance with local power distribution regulations and Max. input (output) current of inverter AC side.

The allowable AC cable of wire diameter and cross-sectional area for inverter are as shown in the following:



NOTICE

Notice:

Determine whether an AC circuit breaker with greater overcurrent capacity is required based on actual conditions.

Residual Current Monitoring Device

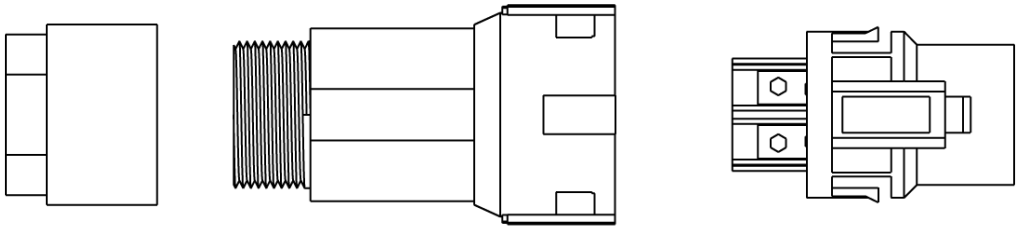
With an integrated universal residual current monitoring device, the inverter will disconnect immediately from the mains once a fault current with a value exceeding the limit is detected.

However, if an external residual current device (RCD) is mandatory, the switch must be triggered at a residual current of 300 mA (type A is recommended), or it can be set to other values according to local regulations. For example, in Australia, the inverter can use an additional 30mA (type A) RCD in installations.

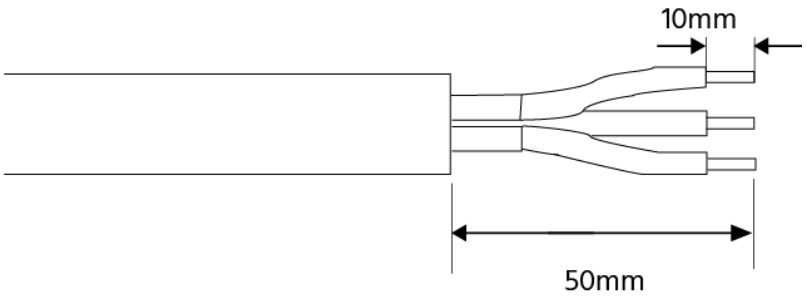
4.3.2 Assembling the AC Connector

The AC terminal block is on the bottom side of the inverter.

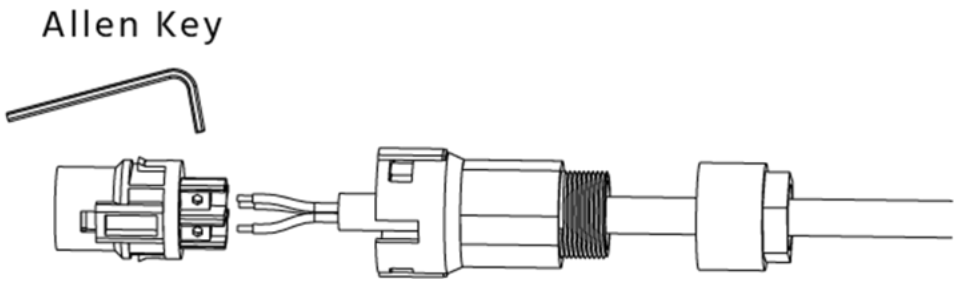
1. Take the AC connector out of the accessory bag and disassemble it.



2. Select an appropriate cable, peel the insulation sleeve of AC cable off for 50mm, and peel off the end of L /PE / N wires for 10mm.



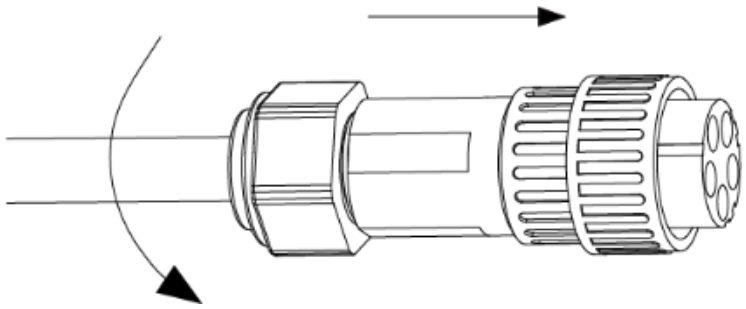
3. Insert the stripped end of the five wires into the appropriate hole of the terminal head. Please try to pull out the cable to make sure it is well connected.



⚠ WARNING

Warning: The cord end terminals must be locked tightly, and make sure it won't be loose after a long period of use.

4. According to the arrow direction push the threaded sleeve to make it connected with the AC terminal head and then rotate the cable gland clockwise to lock it.



4.3.3 Installing the AC Connector

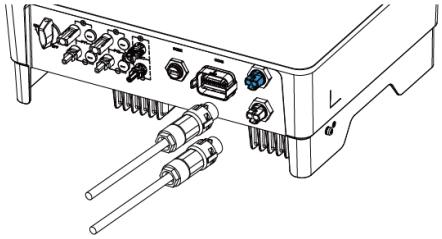
⚠ DANGER

Danger: High voltage may be present in inverter!

Ensure all cables are voltage-free before electrical connection.

Do not connect the AC circuit breaker until all inverter electrical connections are completed.

Connect the AC connector to the inverter AC terminal, and rotate the AC connector buckle clockwise until its tight enough.



⚠ CAUTION

Caution: Please distinguish the on-grid and back-up port, and don't mix up the on-grid port and back-up port when making the connection.

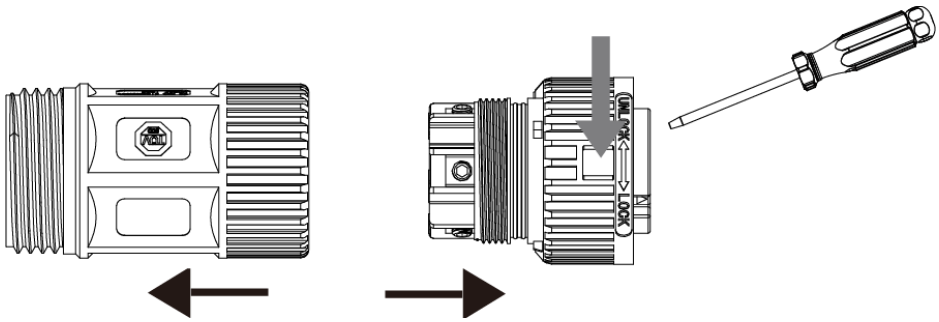
4.3.4 Remove the AC Connector

⚠ DANGER

Danger: High voltage may be present in inverter!

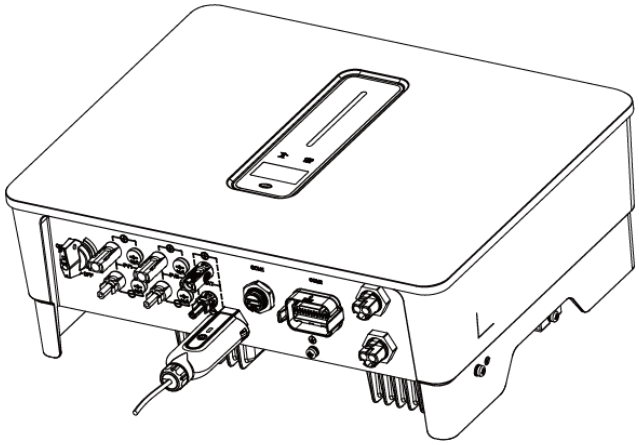
Please disconnect the power supply before removing the AC connector.

Use a flathead screwdriver to align the clips on the AC connector and pull out the AC connector. This section is only for Australia.



4.4 Monitoring Device Installation

Hybrid inverter supports WIFI, LAN, and 4G communication. Plug the Wi-Fi, LAN, or 4G module into the COM1 port in the bottom of inverter. A slight "click" sound during the installation represents that the assembly is in place.



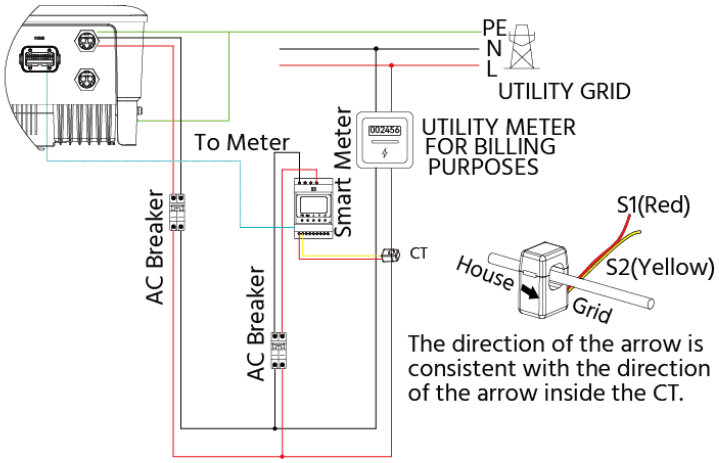
NOTE

Note: Refer to *Section 7 Monitoring* for more information.

4.5 Meter and CT Connection

The current transformer, also called CT, is usually installed on the L wires between the house loads and the power grid.

The Meter can be installed in the AC combiner box or other places that are unable to be touched by children. CT cable with length of 2m, it's fixed and can't be extended. The CTs have been connected to the Meter when you received them, and you just need to follow the wiring diagram in the Meter to connect CT.



NOTICE

Notice:

CT installation direction should strictly follow the instruction in the user manual, otherwise, the inverter may not be working normally.

The CT has to be corresponding with the port in the meter, and the connection between CT and Meter needs to be reliable, otherwise, the CT measurement accuracy may be affected.

NOTE

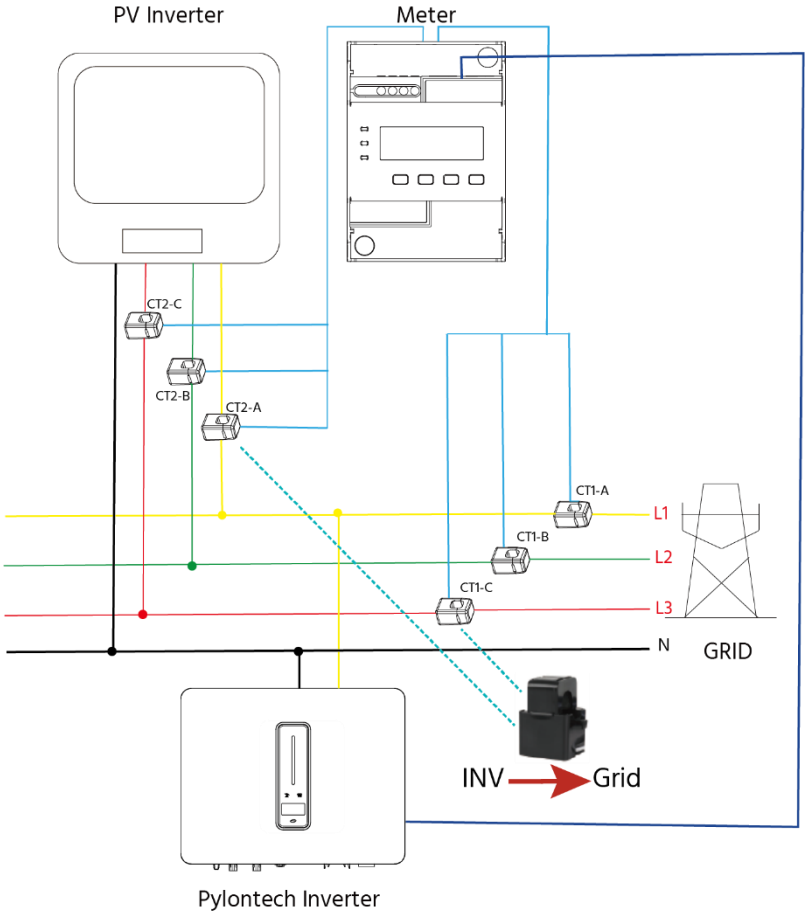
Note: Please choose the appropriate CT size according to your needs.

Meter terminals definition as shown in table below:

No.	Definition RMM	Function
1	L	L/N connect to grid to detect power grid voltage
2	/	
3	/	
4	N	
5	L-S1	To detect the CT current and direction
6	L-S2	
7	/	
8	/	

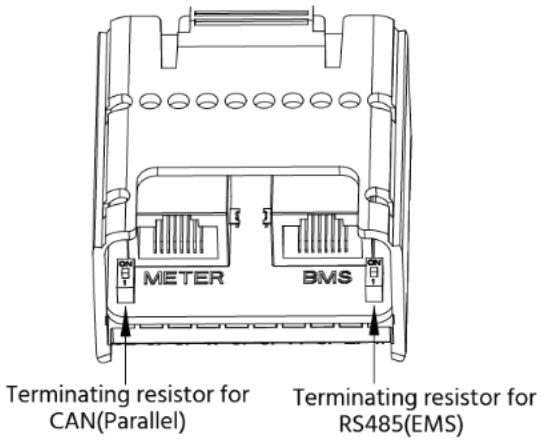
9	/	
10	/	
11	PE	Ground connection
RS485	Reserve	/
	RS485-2	Communicate with hybrid inverter
ANT	Reserve	/
LAN	Reserve	
Type-C	Type-C	Specified Debug Interface. Do not use it by nonprofessionals

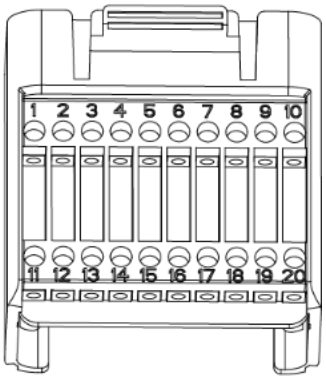
4.6 Three-Phase 6-CT DTSU666 Meter Connection in AC-Coupled System



4.7 Communication Connection

All communication ports are in the Multifunction Communication Port at the bottom of inverter which including Meter port, CAN port, BMS port, EMS port, RLYOUT port, DRED port.



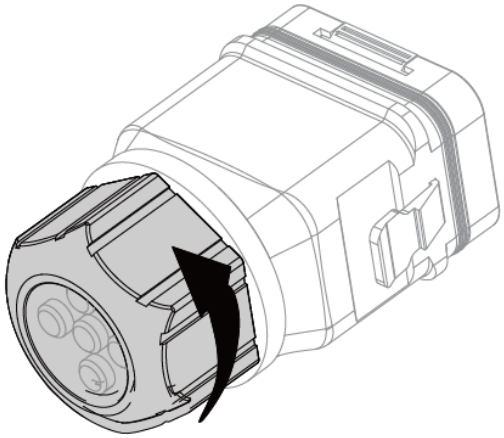


No.	Definition	Function
METER（RJ45-1）	RS 485	Communicate with Meter
BMS（RJ45-1）	CAN	Communicate with BMS
1	COM	Multifunction Relay
2	NO (Normally Open)	
3	/	Reserved
4	/	Reserved
5	DRM4/8	DRED For Australia and New Zealand RCR For Germany and some other European countries
6	DRM3/7	
7	DRM2/6	
8	DRM1/5	
15	COM D/0	
16	REF D/0	
11	Emergency stop +	Emergency stop

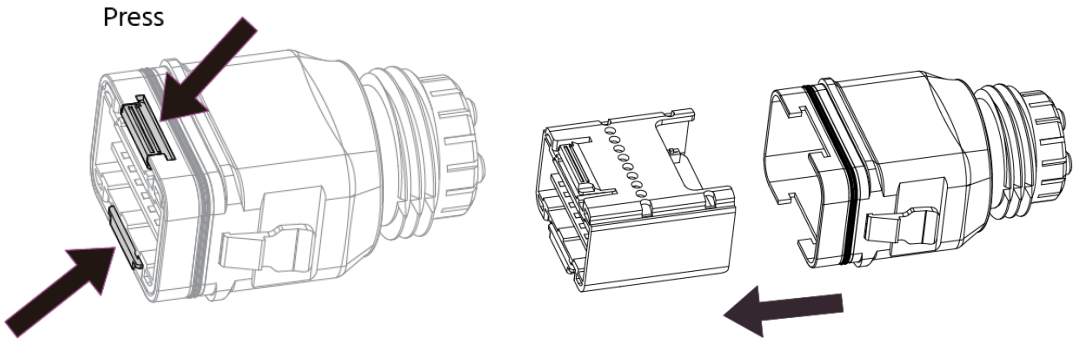
12	Emergency stop -	
13	485 B1	EMS
14	485 A1	
17	CANL_P	CAN for parallel connection of inverters
18	CANH_P	
19	/	Reserved
20	/	Reserved

4.7.1 Disassemble the Multi-com Connector

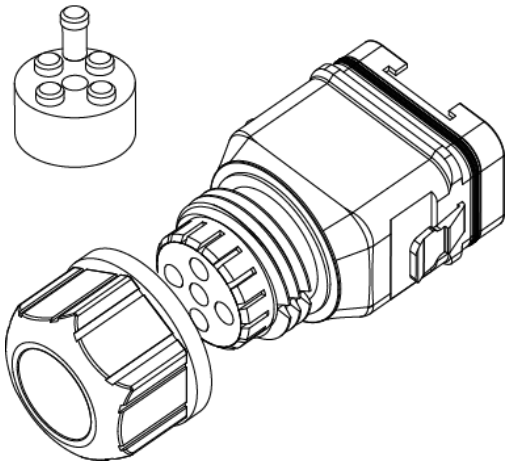
1. Unscrew the swivel nut from the connector.



2. Take out the terminal block.



3. Remove the seal and lead the cable through the cable gland.

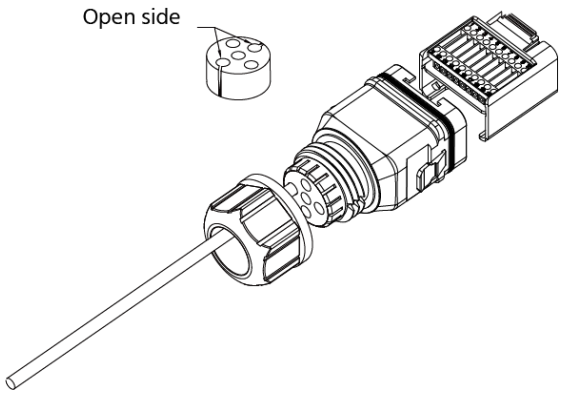


4.7.2 Connect the Meter and BMS Communication Cables

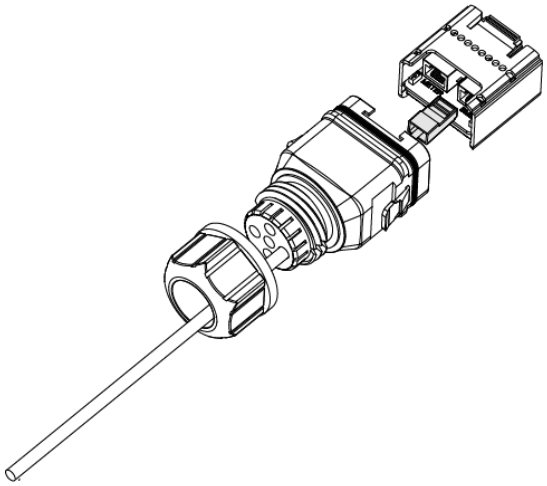
NOTE

Note: The communication between meter/BMS and inverter is RJ45 interface cable.

1. Thread the RJ45 plug of appropriate length through the swivel nut, and insert it into the open side of the rubber gasket.



2. Insert one side of the RJ45 plug into the RJ45 port of terminal block.



3. Connect the communication cable.

- **Using the meter supplied in the inverter package:**

Connect the meter communication cable included in the inverter package to the RS485-2 port of the meter and to the Meter port on the inverter Multi-com Connector.

- **Using a three-phase meter with 6 CTs in the optional kit:**

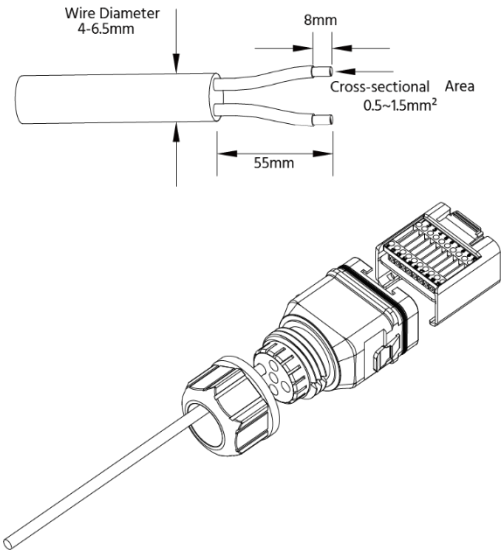
Fabricate the communication cable according to the RJ45 terminal pin assignment and definition listed in the table below. Then connect the cable between the RS485 port of the three-phase meter and the Meter port on the inverter Multi-com Connector.

No.	Color	Inverter COM Side	3-Phase 6CTs Meter Side
1	Orange & White	/	/
2	Orange	/	/

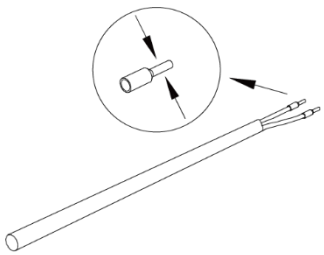
3	Green & White	/	RS485_A
4	Blue	/	/
5	Blue & White	/	/
6	Green	/	RS485_B
7	Brown & White	RS485_B2	/
8	Brown	RS485_A2	/

4.7.3 Connect Other Signal Cables (Optional)

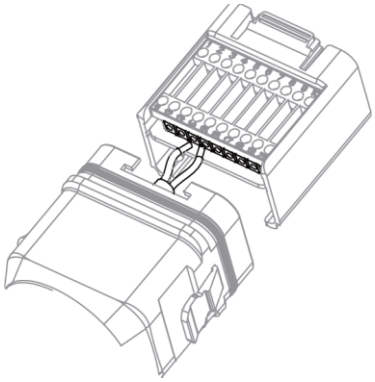
1. Thread the cable of appropriate length through the swivel nut and the housing. Remove the cable jacket and strip the wire insulation.



2. (Optional) When using a multi-core multi-strand copper wire cable, connect the AC wire head to the cord end terminal (hand-tight). In case of single-strand copper wire, skip this step.

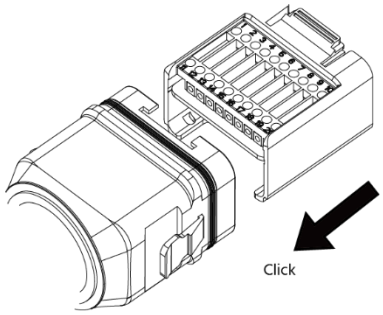


3. Fix all the wires to the terminal plug according to the assignment and tighten to a torque of 1.2+/-0.1N·m with a screwdriver.

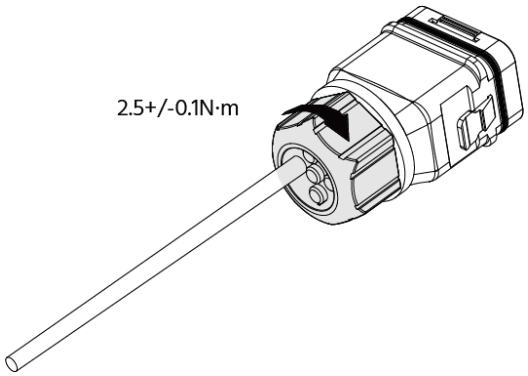


4. Pull the wires outward to check whether they are firmly installed.

   Insert the terminal block into the connector until it snaps into place with an audible click.



5. Fasten the swivel nut.



4.7.3.1 EMS Communication

An EMS communication cable needs to be connected when to control the operation of a hybrid inverter through the EMS, and communication between EMS and inverter is RS485.

4.7.3.2 DI Ctrl

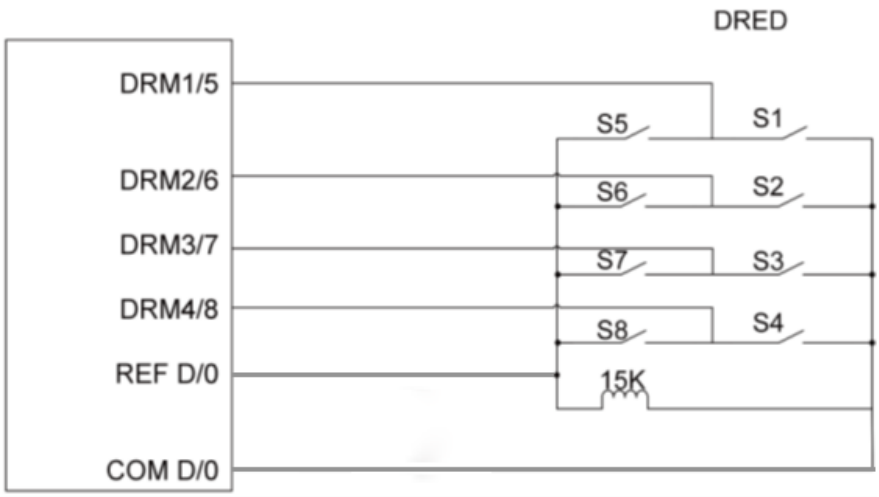
DRM and Ripple Control support only one function at the same time.

DRM

DRED (Demand Response Enabling Device) interface is special reserved for Australia and New Zealand according to their safety regulation, and Pylontech doesn't provide the DRED device for the customer. The inverter supports the demand response modes as specified in the standard

AS/NZS 4777. The inverter has integrated a terminal block for connecting to a DRED.

DRED wiring diagram (hybrid inverter) as below:



DRED mode as shown in table below:

Mode	Function
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
Priority	DRM1 > DRM2 > DRM3 > DRM4
	DRM5 > DRM6 > DRM7 > DRM8

NOTE

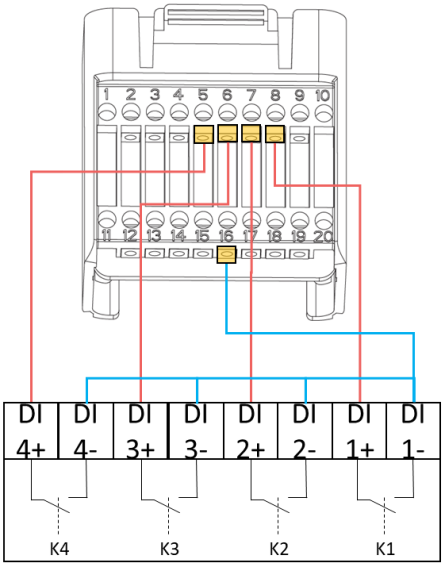
Note: There is a resistor between 15(COM D/0) and 16(REF D/0), do not move the resistor while wiring.

RCR

RCR (Ripple Control Receiver) interface is special reserved for Germany and some other European country according to their safety regulation, and Pylontech doesn't provide the RCR device for the customer.

In Germany and some European areas, a ripple control receiver is used to convert a power grid dispatching signal to a dry contact signal. The dry contact is required for receiving the power grid dispatching signal.

RCR wiring diagram (hybrid inverter) as below:



Ripple Control Receiver

RCR operation mode as shown in table below:

Switch Mode (External RCR Device)	Feed-in Output Power (in % of the Rated AC Output Power)
K1 turn on	100%
K2 turn on	60%
K3 turn on	30%
K4 turn on	0%
RCR priority: K1<K2<K3<K4	

4.7.3.3 Multifunction Relay

The inverter is equipped with a multifunction dry contact relay, which helps turn the loads on or off when an extra contactor is connected, or startup the diesel generator when the diesel generator startup signal is connected.

NOTICE

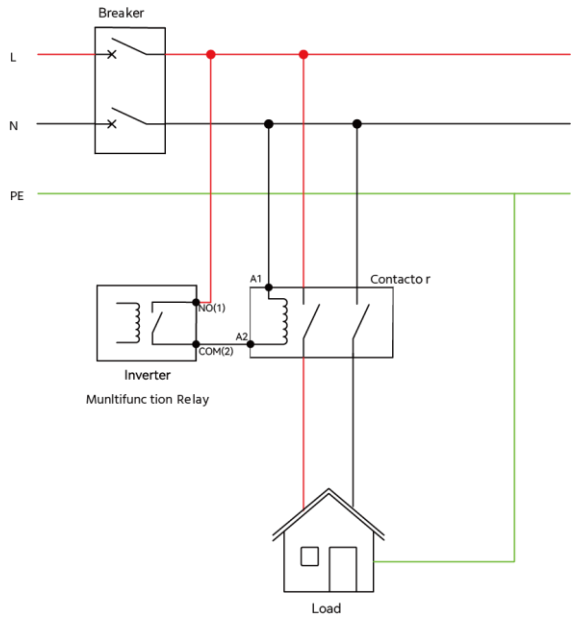
Notice:

Maximum voltage and current at DO dry contact port: 230VAC 1A/ 30VDC 1A.

NOTE

Note: For more installation and setup information, please contact Pylontech.

Load Control

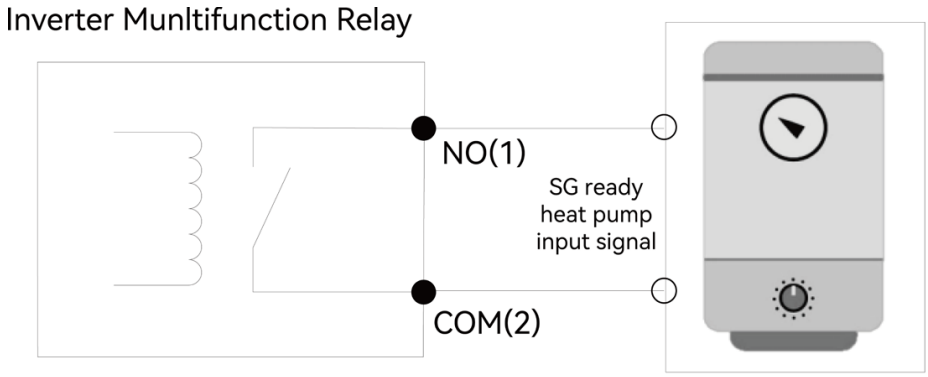


NOTE

The AC contactor should be placed between the inverter and the loads. Do not connect the load to DO port directly.

The contactor is not supplied by the Pylontech. Connect the load to the DO port of the inverter directly if the load is designed with a DI port. When the controlled load is connected to ONGRID, the contactor coil must also be connected to ONGRID. When the controlled load is connected to BACKUP, the contactor coil must also be connected to BACKUP.

SG Ready heat pump control



Hybrid Inverter is matched with a SG-ready heat pump with dry contact port, which can realize heat pump integrated energy system management.

Most heat pumps today have a digital control input, such as SG ready, allowing external signals to influence the working of the heat pump. Please refer to the heat pump manufacturer's manual for more information on the specific control input of the heat pump.

Mode	State	SG Ready Recommendation	Validity	DO-1 State
1	OFF	HP switched off	/	/
2	Normal	HP operates in normal energy efficient mode.	Yes	0
3	Recommended ON	HP is operating in an enhanced heating mode.	Yes	1
4	Forced ON	HP has to switch on.	/	/

NOTICE

Notice:

Hybrid Inverter only supports Mode 2 and Mode 3 of SG ready. Inverter switches between mode 2 and mode 3.

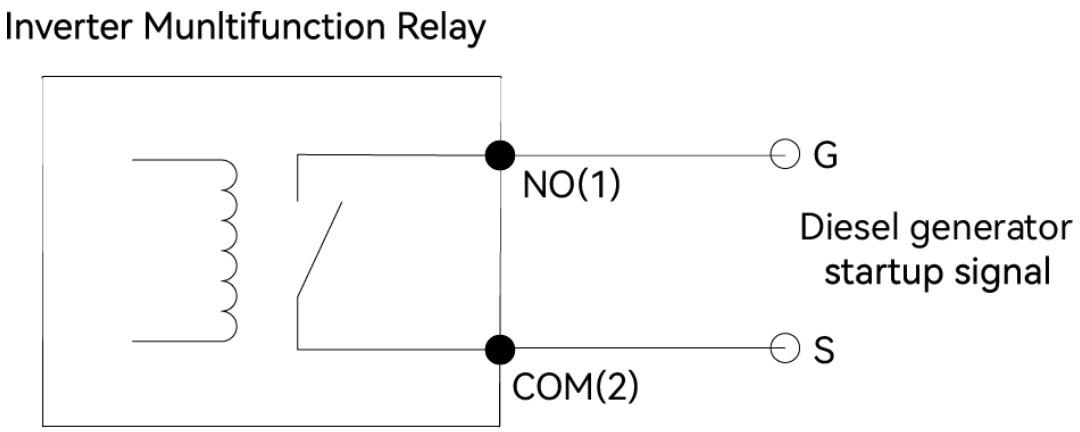
Load Management

Hybrid Inverter has three work modes to control smart loads (such as SG ready heat pump).

Work Mode		Application Description
Disable		Disable means not using the load management function.
Smart Mode	Feed-in Power Control	Set the feed-in power threshold for triggering the heat pump entering Mode3 or turn on smart load. When the meter detects the feed-in power equal to or greater than the set value, inverter relay will close and heat pump will enter heating mode or smart loads start working. This control mode is suggested to use in the system without power export limitation.
	Battery SOC Control	Set the battery SOC threshold for triggering the heat pump entering Mode3 or turn on smart load. When inverter detects the battery SOC value equal to or greater than the set value, inverter relay will close and heat pump will enter heating mode or smart loads start working. This control mode is suggested to use in the system with power export limitation.
	Time Control	Set the operation periods for heat pump mode three or smart load according to user habits or preferences. Up to 3 periods can be set. When this mode is enabled, a higher priority than other modes within the period. Outside the period, the heat pump or smart load operates according to the parameters set by the smart mode. If this mode is not enabled or no period is set, it operates according to the parameters set by the smart mode throughout the day.
Manual Mode		Manually control the heat pump entering Mode3 or start the smart load.

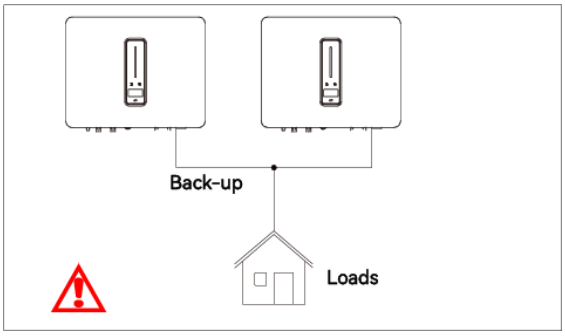
Please login the monitoring platform or APP for more specific configuration of Load Management.

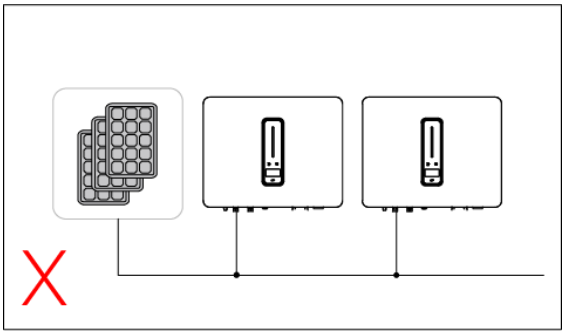
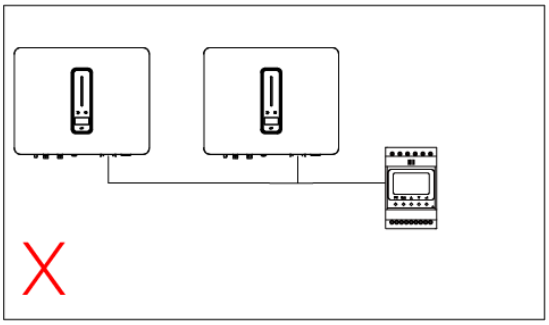
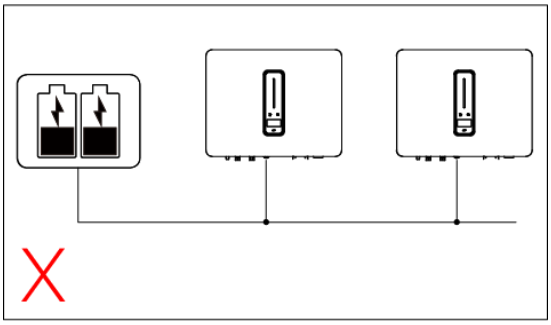
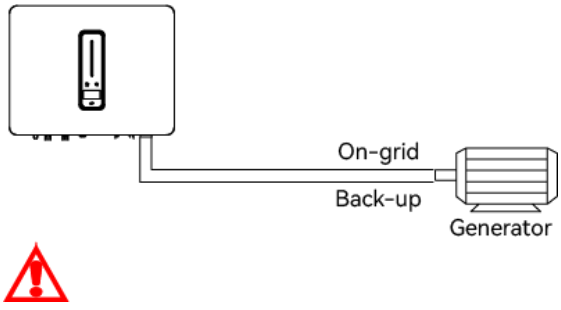
Generator Control Connection Diagram

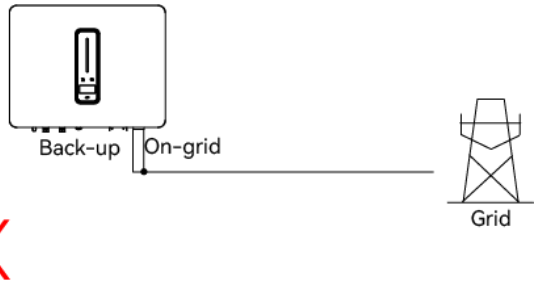


When the “GEN signal” is active, the open contact (GS) will switch on (no voltage output).

4.7.3.4 Parallel System

<table>
<tr>
<td>

For the general version, back-up cannot connect in parallel. For advanced applications, please contact our after-sales department.</td>
<td>
Single PV string cannot connect to multiple inverters.</td>
</tr>
<tr>
<td>
One meter cannot be connected to multiple inverters. Different CTs cannot connect to the same line cable.</td>
<td>
One battery bank cannot be connected to multiple inverters.</td>
</tr>
<tr>
<td>

The on-grid and back-up side cannot be connected to and generator directly.
For advanced applications, please contact our after-sales department.</td>
<td>

The back-up side cannot be connected on-grid side or grid.</td>
</tr>
</table>

NOTE

Note: For more installation and setup information about parallel system, please contact Pylontech.

NOTICE

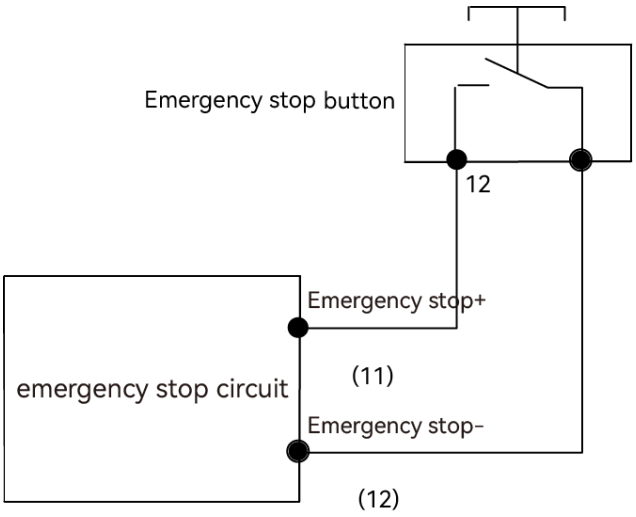
Notice:

Testing to AS/NZS 4777.2:2020 for multiple inverter combinations has not been conducted.

Multiple inverter combinations should not be used.

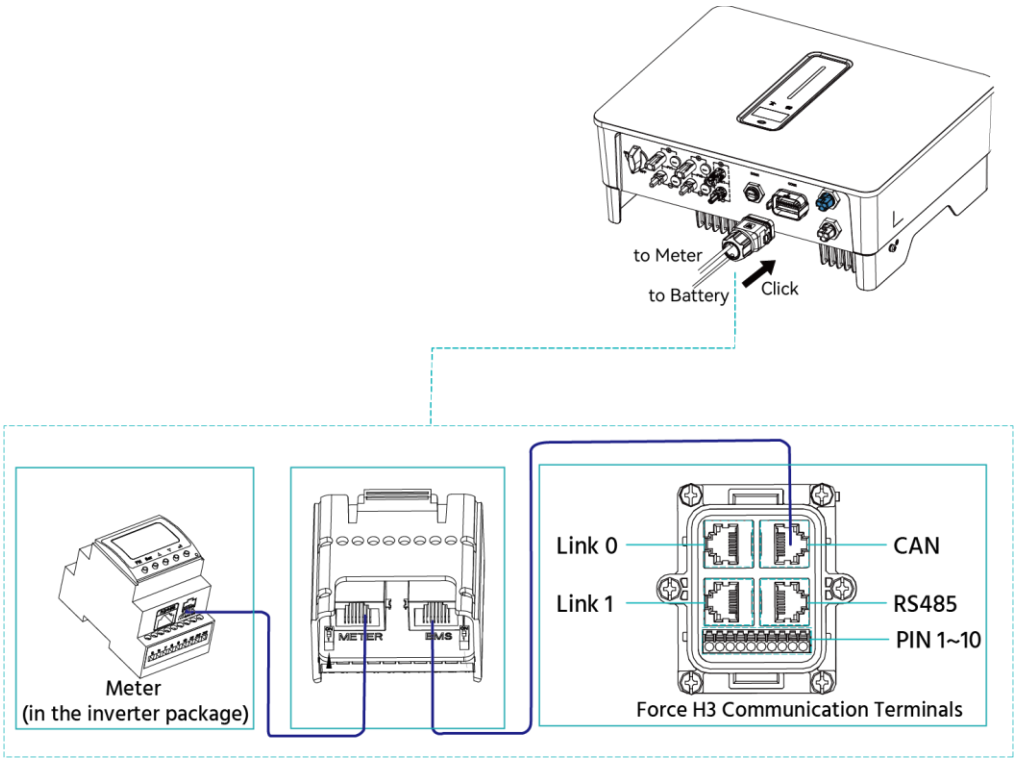
4.7.3.5 Emergency Stop

Hybrid inverter comes standard with stop function, and you can use this function by connecting an external switch into the Emergency stop interface if required in the installation place. The external switch doesn't include in our accessory box.



4.7.4 Installing the COM Connector

1. Remove the waterproof lid from the COM terminal.
2. Insert the COM connector into COM terminal on the bottom of the inverter until there is an audible click.



4.8 PV String Connection

DANGER

Danger: High voltage may be present in the inverter!

Ensure all cables are voltage-free before performing electrical operations.

Do not connect the DC switch and AC circuit breaker before finishing electrical connection.

NOTICE

Notice: For best practice, ensure PV modules of the same model and specifications are connected in each string.

WARNING

Warning: When the photovoltaic array is exposed to light, it supplies a d.c. voltage to the inverter.

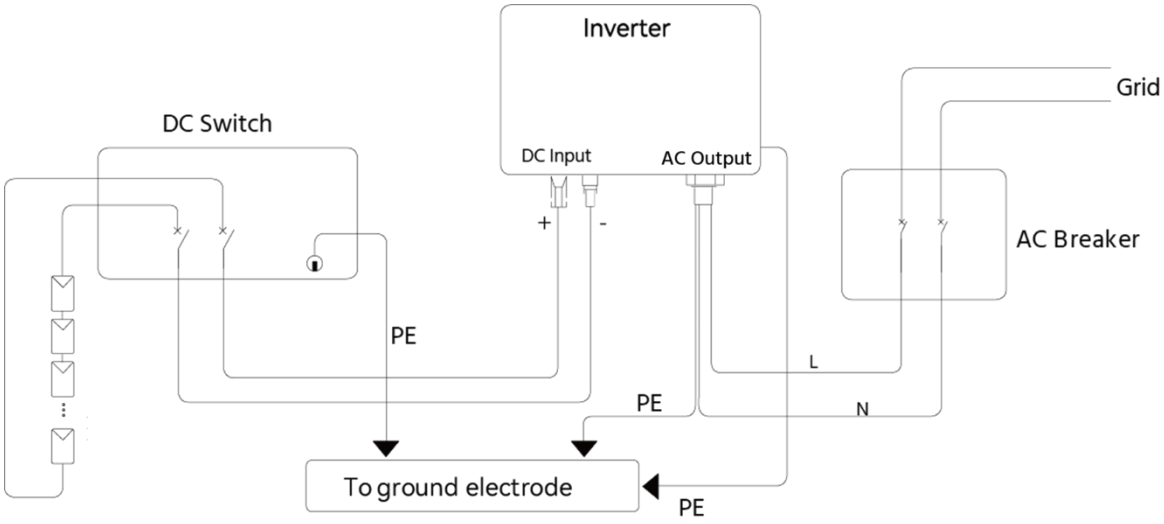
WARNING

Warning: PV Max. Input voltage is 550V without battery, or 500V with battery, otherwise inverter will be waiting.

4.8.1 PV Side Requirements

System Layout of Units with External DC Switch

1. Local standards or codes may require PV systems that fit with an external DC switch on the DC side. The DC switch must be able to safely disconnect the open-circuit voltage of the PV array plus a safety reserve of 20%. Install a DC switch to each PV string to isolate the DC side of the inverter.
2. The DC switch has to be certified by AS 60947.3:2018 and AS/NZS IEC 60947.1:2020 in Australia and New Zealand market. The Max. current of the DC switch matching with inverter is no less than 40A. We recommend the following electrical connection.



Select the appropriate photovoltaic cable

Cable Requirements		Cable Stripping Length
Outside Diameter	Conductor Core Section	
5.9-8.8 mm	4 mm²（12AWG）	7 mm

4.8.2 Assembling the PV Connector

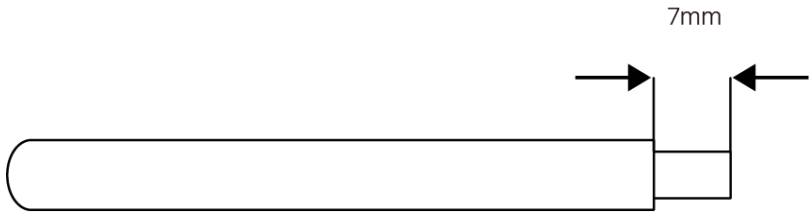
⚠ WARNING

Warning: Before assembling the DC connector, make sure that the cable polarity is correct.

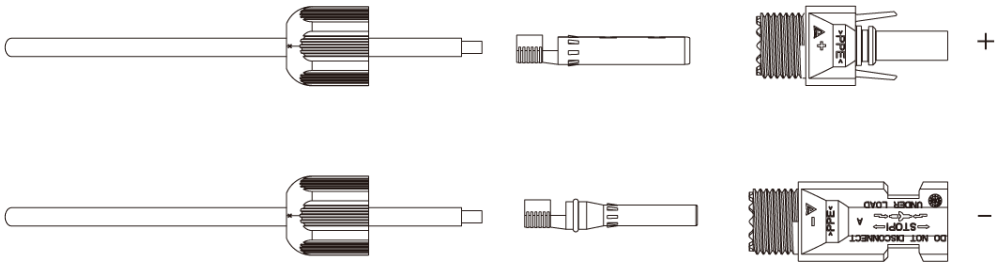
NOTE

Note: Please distinguish U-profile pin (PV terminal) and O-profile pin (Battery terminal). Recommended for crimping U-profile pin with “Phoenix CRIMPFOX-RC 10-Indent Crimping pliers”.

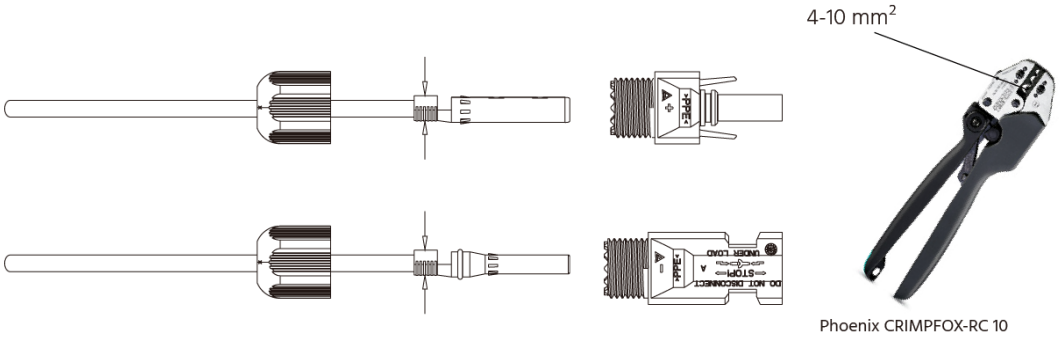
1. Peel off the DC cable insulation sleeve for 7 mm.



2. Disassemble the connector in the accessory bag.

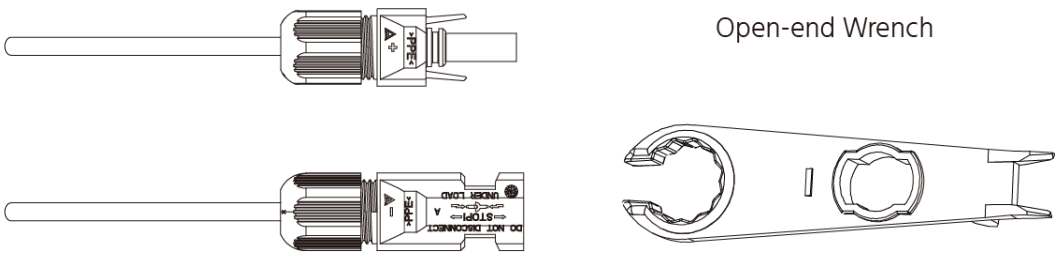


3. Insert the DC cable through the DC connector nut into the metal terminal and press the terminal with a professional crimping plier (pull back the cable with some power to check if the terminal is well connected to the cable).



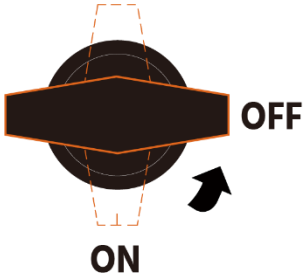
4. Insert the positive and negative cables into the corresponding positive and negative connectors, pull back the DC cable to ensure that the terminal is tightly attached in the connector.

5. Use an open-end wrench to screw the nut to the end to ensure that the terminal is well sealed.

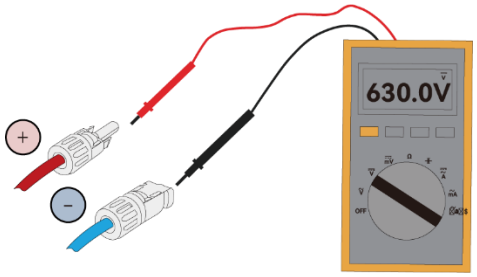


4.8.3 Installing the PV Connector

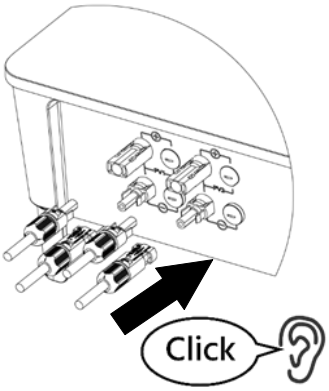
1. Rotate the DC switch to “OFF” position.



2. Check the cable connection of the PV string for polarity correctness and ensure that the open circuit voltage in any case does not exceed the inverter input limit of 600V. PV Max. input voltage is 550V without battery, or 500V with battery, otherwise inverter will be waiting.



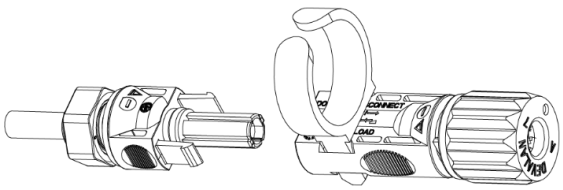
3. Insert the positive and negative connectors into the inverter DC input terminals respectively, a click sound should be heard if the terminals are well connected.



4. Seal the unused PV terminals with the terminal caps.

4.8.4 Remove the PV Connector

Please use the unlocking tool to remove the PV connector.



4.9 Power Cable of the Battery Connection

NOTE

Note: Please contact Pylontech for detailed battery installation information.

4.9.1 Principles

The following principles must be considered when making battery connection:

1. Disconnect the AC breaker on the grid side.
2. Disconnect the breaker on the battery side.
3. Turn the inverter DC switch to the OFF position.
4. Make sure the maximum input voltage of battery is within the inverter limitation.

⚠CAUTION

Caution: In the external battery circuit, fuses (or DC breaker) must be installed on both the positive and negative poles.

4.9.2 Battery Side Requirements

Select appropriate DC cables

Cable Requirements		Cable Stripping Length
Outside Diameter	Conductor Core Section	
5.0-8.0 mm	10 mm²（8AWG）	10 mm

⚠CAUTION

Caution: If the conductor core of the battery cable is too small, which may cause poor contact between the terminal and the cable, please use the cable specified in the above table, or contact Pylontech to purchase terminals of other specifications.

Cables between inverter and a single battery (Force H3 battery system)

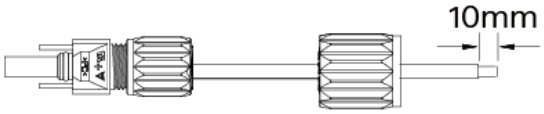
1. Make Cable A

   a) Cut off the ring terminal of Force H3 power cable.

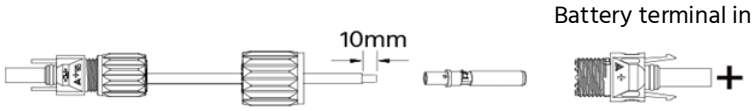


Power cable of Force H3

b) Peel off the battery cable insulation sleeve for 10 mm.



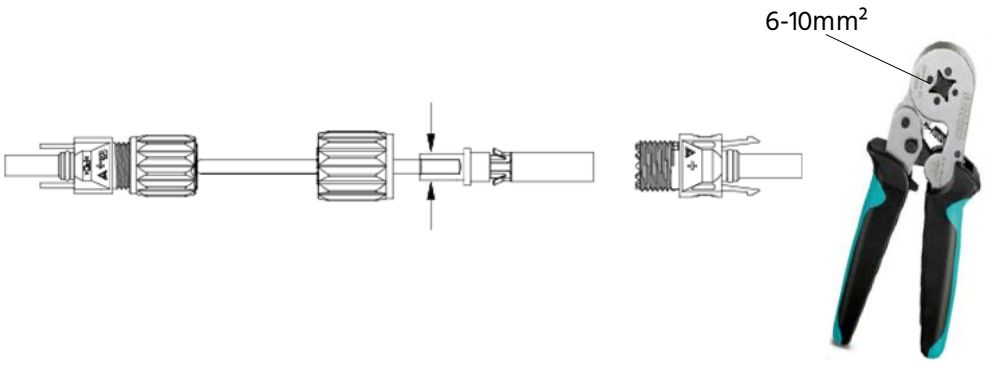
c) Disassemble the connector in the accessory bag.



d) Insert the battery cable through the battery connector nut into the metal terminal and press the terminal with a professional crimping plier (pull back the cable with some power to check if the terminal is well connected to the cable).

NOTE

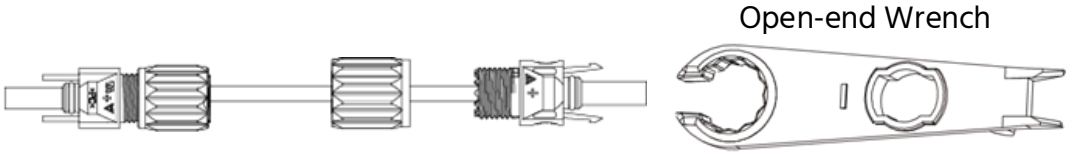
Note: Please distinguish U-profile pin (PV terminal) and O-profile pin (Battery terminal). Recommended for crimping O-profile pin with "Phoenix CRIMPFOX 10S-Square Crimping pliers"



Phoenix CRIMPFOX 10S

e) Insert the positive and negative cables into the corresponding positive and negative connectors, pull back the battery cable to ensure that the terminal is tightly attached in the connector.

f) Use an open-end wrench to screw the nut to the end to ensure that the terminal is well sealed.



⚠ WARNING

Warning:

- Before making the battery connector, please make sure the polarity of the cable is correct.
- Use a multimeter to measure the voltage of the battery pack and make sure the voltage is within the inverter limitation and the polarity is correct.

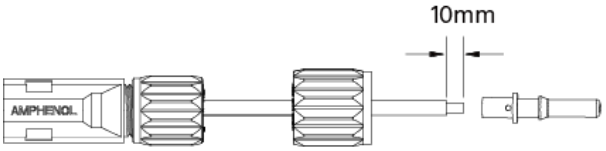
2. Make Cable B

a) Cut off the ring terminal of Force H3 power cable.

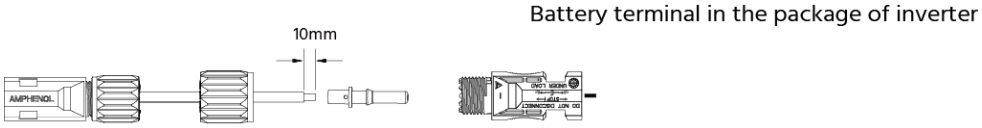


Power cable of Force H3

b) Peel off the battery cable insulation sleeve for 10 mm.



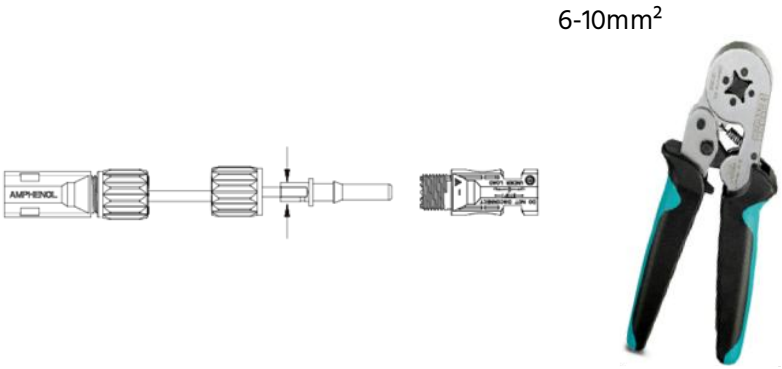
c) Disassemble the connector in the accessory bag.



d) Insert the battery cable through the battery connector nut into the metal terminal and press the terminal with a professional crimping plier (pull back the cable with some power to check if the terminal is well connected to the cable).

NOTE

Note: Please distinguish U-profile pin (PV terminal) and O-profile pin (Battery terminal). Recommended for crimping O-profile pin with "Phoenix CRIMPFOX 10S-Square Crimping pliers".



e) Insert the positive and negative cables into the corresponding positive and negative connectors, pull back the battery cable to ensure that the terminal is tightly attached in the connector.

f) Use an open-end wrench to screw the nut to the end to ensure that the terminal is well sealed.



Cables between inverter and two strings of battery (Force H3 battery system).

1. Make Cable C (2pcs).

   Follow the Cable A installation steps, but use the terminals supplied with the optional harness kit instead of the one in the inverter package.

2. Make Cable D (2pcs).

   Follow the Cable B installation steps, but use the terminals supplied with the optional harness kit instead of the one in the inverter package.

3. Make Cable E (2pcs).

Prepare an additional pair of positive and negative cables to serve as the combined positive and negative outputs that connect from the Y-connector to the inverter battery terminals.

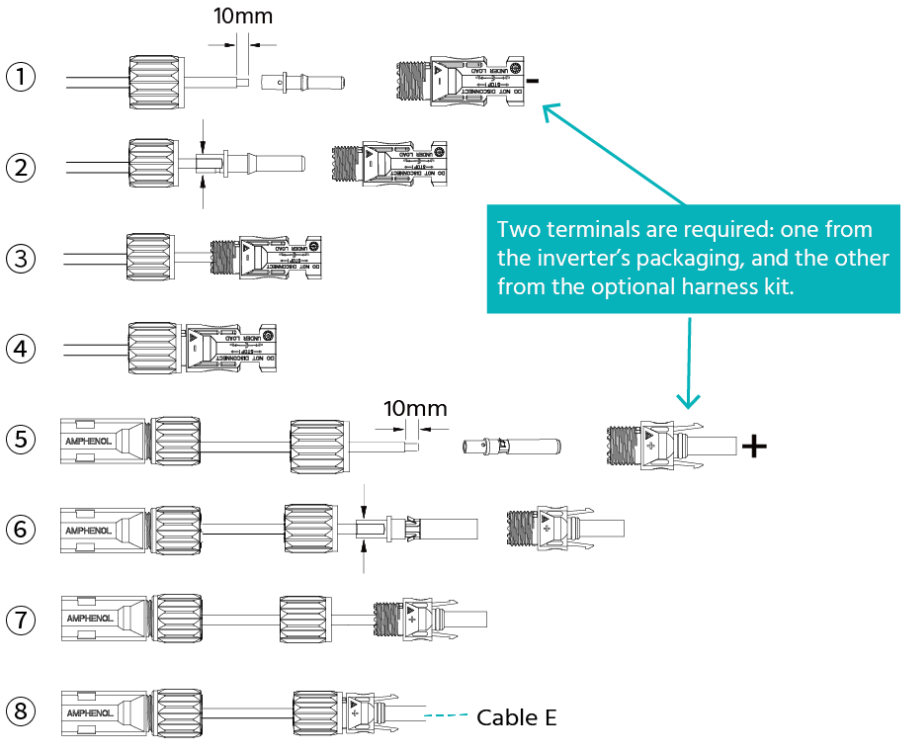
NOTE

Note: Two Terminals are required: one from the inverter package, and the other from the optional harness kit

a) Strip approximately 10 mm of insulation from each cable.

b) Insert the cable through the connector nut into the metal terminal and crimp the terminal with a professional crimping tool.

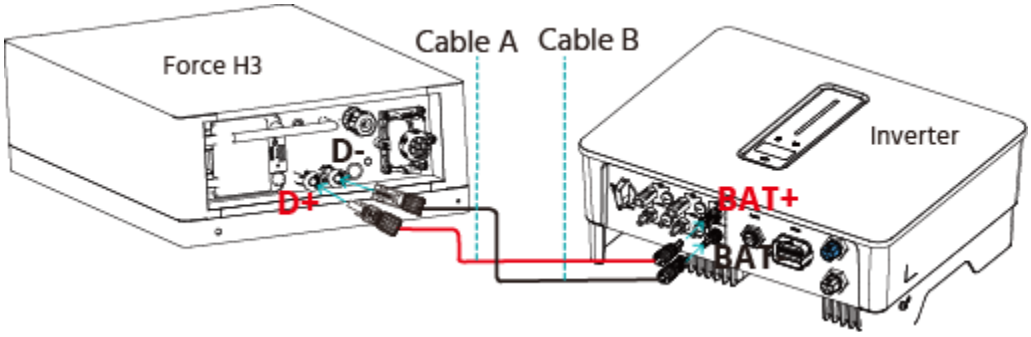
c) Insert the prepared positive and negative cables into the corresponding positive and negative connector housings.



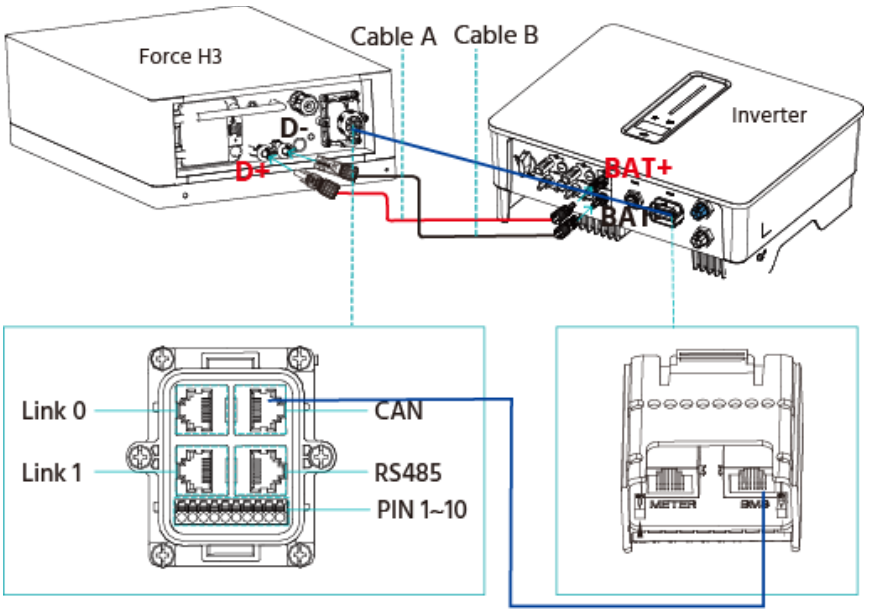
4.9.3 Force H3 Connector Assembly Procedures

Connection between inverter and a single battery (Force H3 battery system)

1. Insert the positive and negative connector into the inverter battery terminals respectively, and a "click" sound represents the assembly in place.

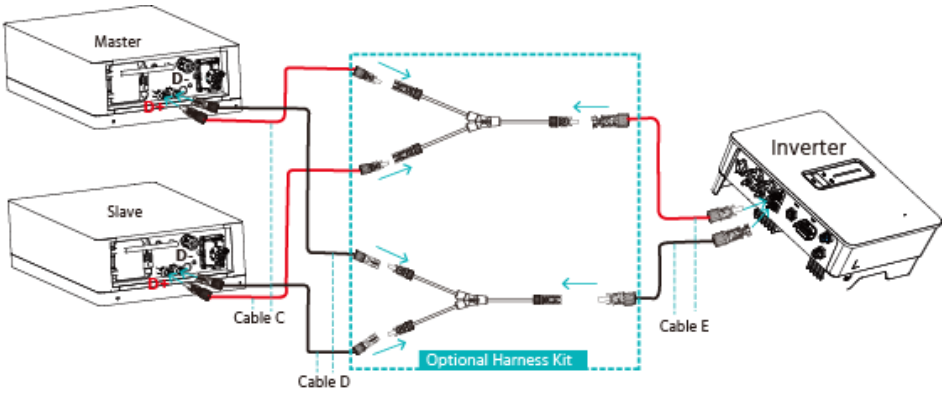


2. Connect the communication cable.

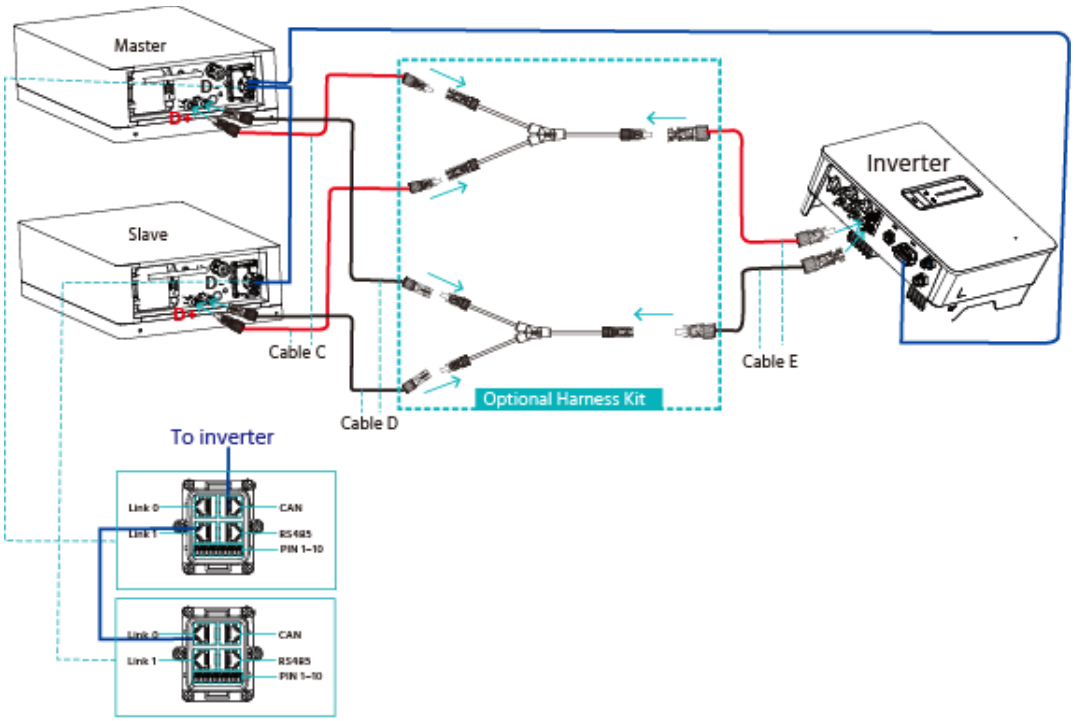


Connection between inverter and two strings of battery (Force H3 battery system)

1. Insert each batter's positive cable into one of the positive input ports of the Y-connector.
2. Insert each batter's negative cable into one of the negative input ports of the Y-connector.
3. Ensure all terminals are fully seated and securely locked
4. Connect the positive output of the Y-connector to the inverter battery positive terminal.
5. Connect the negative output of the Y-connector to the inverter battery negative terminal.



6. Connect the communication cables between the master and slave batteries, and between the master battery and the inverter.


Master
Slave
Inverter
Cable C
Cable D
Cable E
Optional Harness Kit
To inverter
Link 0
Link 1
CAN
RS485
PIN 1~10

5 Commissioning

5.1 App Preparation

1. Install the Local configuration App and Cloud monitoring App with latest version. Refer to *Section 7.2 Cloud Monitoring*.
2. Register an account on the Cloud monitoring App. If you have got the account and password from the distributor/installer, skip this step.

5.2 Inspection Before Commissioning

Check the following items before starting the inverter:

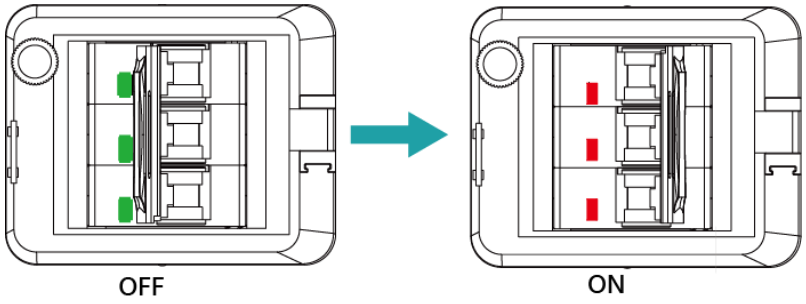
1. All equipment has been reliably installed.
2. DC switch and AC circuit breaker are in the "OFF" position.
3. The ground cable is properly and reliably connected.
4. The AC cable is properly and reliably connected.
5. The DC cable is properly and reliably connected.
6. The communication cable is properly and reliably connected.
7. The vacant terminals are sealed.
8. No foreign items, such as tools, are left on the top of the machine or in the junction box (if there is).
9. The AC circuit breaker is selected in accordance with the requirements of this manual and local standards.
10. All warning signs & labels are intact and legible.

5.3 Commissioning Procedure

If all of the items mentioned above meet the requirements, proceed as follows to start up the inverter for the first time.

Normal Startup

1. Turn on all the battery breakers of Force H3 battery system.



2. Press Start Button for at least 5 seconds or until buzzer rings.



NOTICE

Notice:

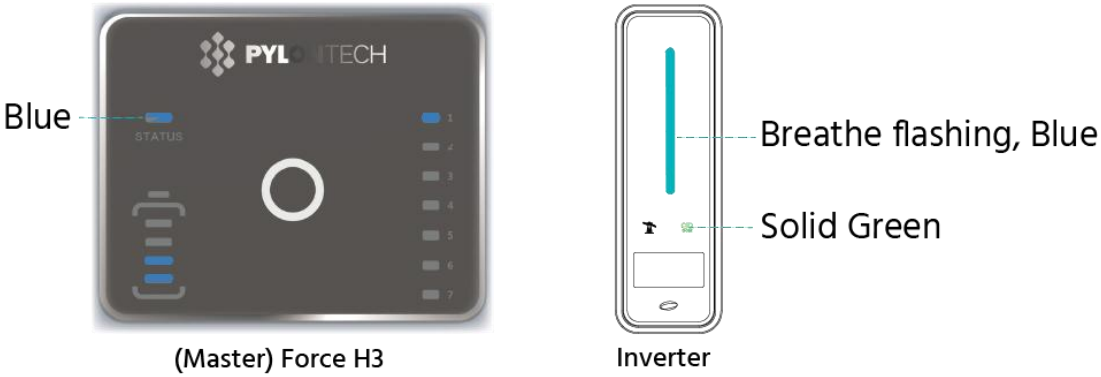
When using multiple strings of batteries, power on the slave battery first.

The battery performs self-checking for 10-30 seconds, until the Status LED turns orange.



3. Turn on the AC breaker between the inverter and grid, or turn on the DC switch on the inverter.

4. After the relays of the battery and the inverter have audibly closed, observe the LEDs of the inverter and Status LED of (master) battery to check the system status.



Black Start

If the system has to be powered on without PV and Grid, use the battery to perform a black start to power on the inverter.

1. Repeat step 1 to 2 in Section Normal Startup.
2. Press Start Button on the (master) battery for at least 10 seconds till the Status LED lighting blue. Then the battery will perform black start to support the inverter.
3. After the relays of the battery and the inverter have audibly closed, observe the LEDs of the inverter and Status LED of (master) battery to check the system status.

NOTE

Note: If the inverter does not work properly, check the safety code and battery ID Settings.

1. Select the safety code suitable for the country (region) where the inverter is installed at.
2. Select the battery ID suitable for the battery is installed.

NOTE

Note: CT AUTO TEST FUNCTION

Hybrid inverter has the function of detecting the installation direction and phase sequence of CT. The system is installed; this function can be enabled on the APP for detection.

NOTICE

Notice: SOC RESET FUNCTION

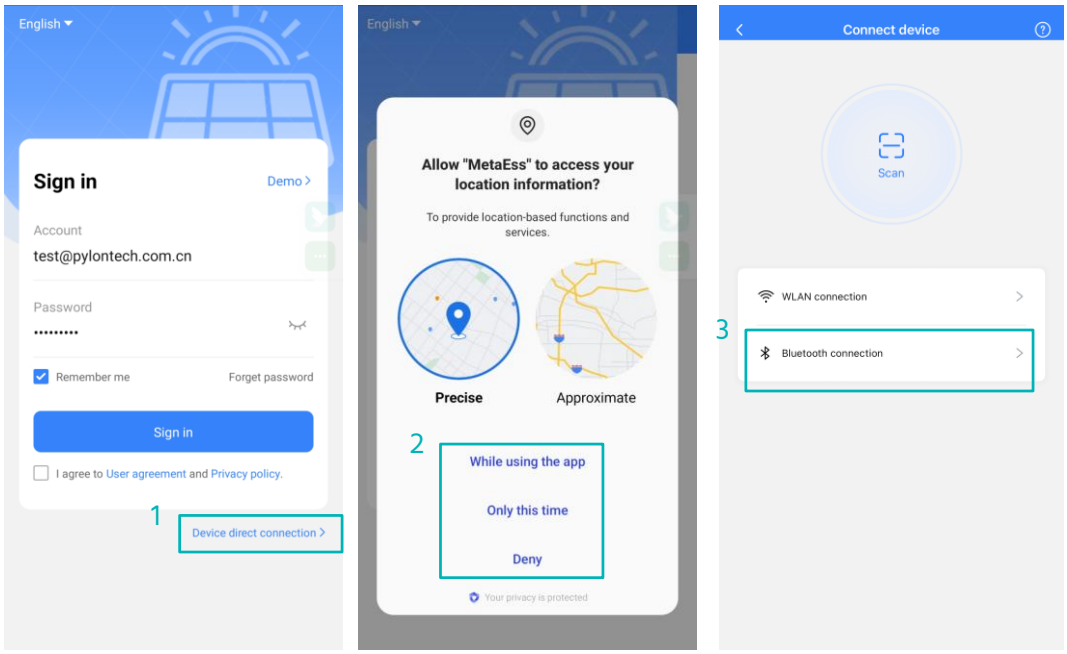
When the inverter is turned on for the first time, the battery will be automatically charged to calibrate the battery SOC. After the battery is charged, this function will be turned off automatically (If you confirm that it is not necessary, you can manually turn off the function. We recommend to enable this function.)

If you need to calibrate the SOC during system use, you can manually enable the function to calibrate the battery SOC on app or inverter screen. After the battery is fully charged, the function is automatically disabled again.

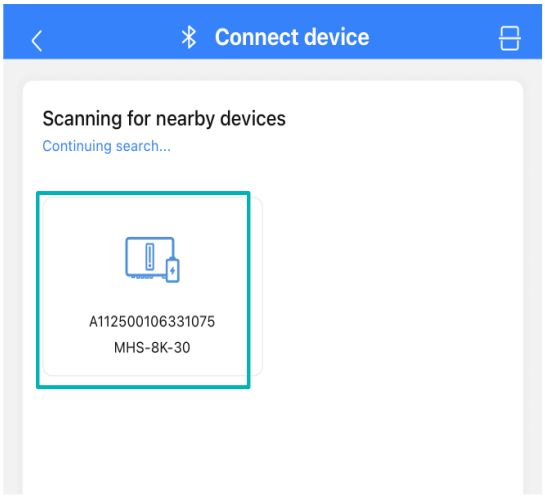
5.4 Startup check

Viewing inverter settings after commissioning including:

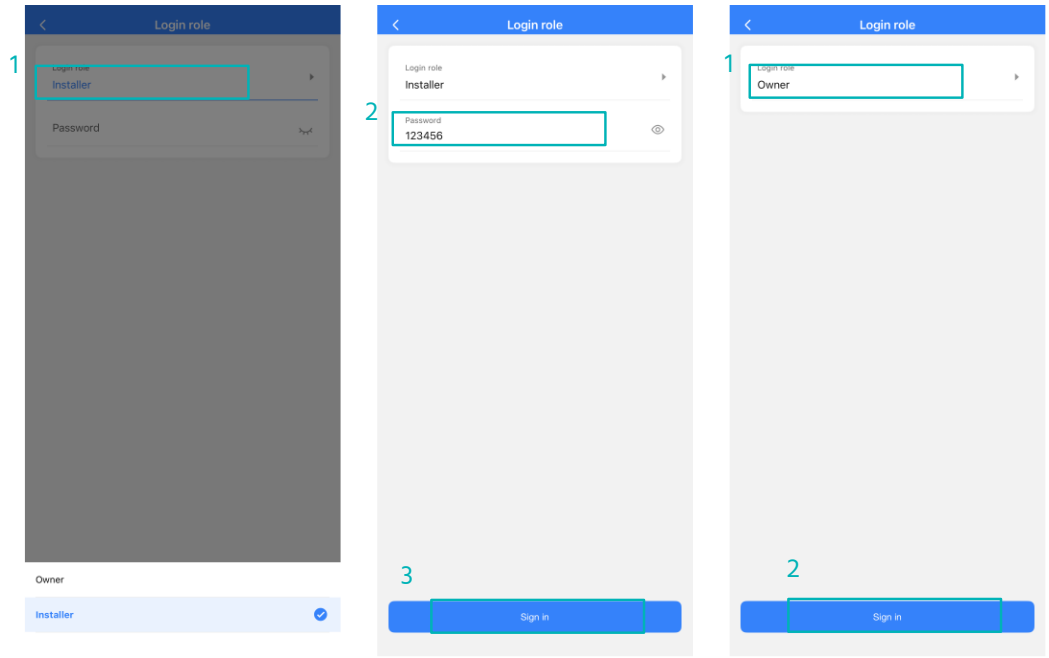
Open the monitoring application, click "Device direct connection", grant location access, and then select Bluetooth connection.



Wait for device search to complete, select the target device.

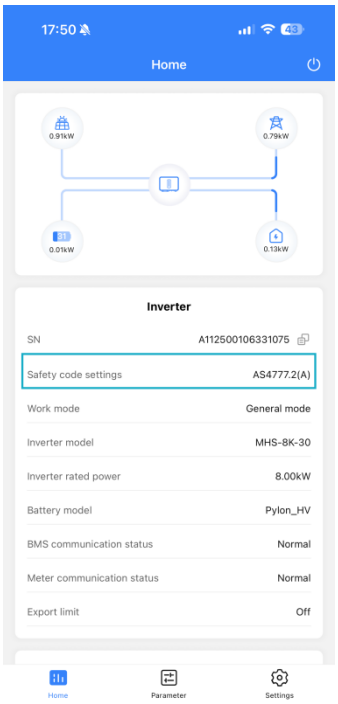


Then choose the login role. When logging in as an Installer, enter the password 123456. When logging in as an Owner, click "Sign in" to proceed.



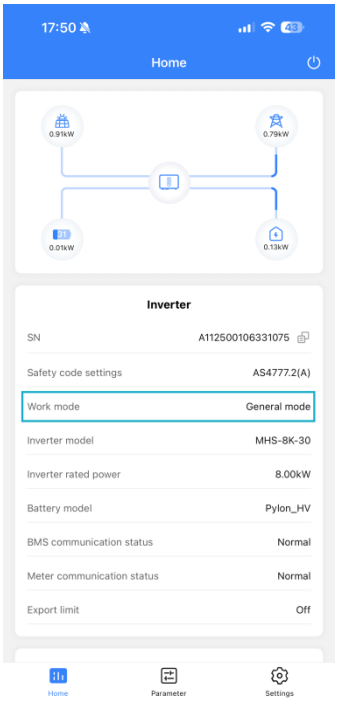
- **Country Grid Code/Region settings**

Once logged in, check the Country Grid Code on the home page.The grid code for Australia should be: AS4777.2(A)



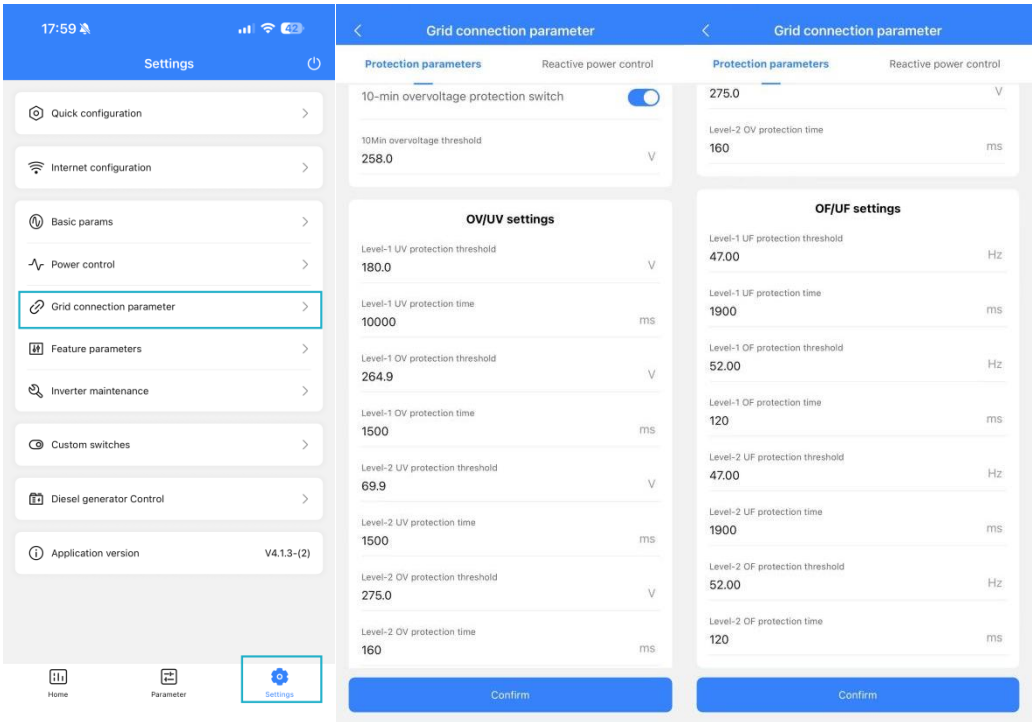
- **Power quality response modes settings**

Once logged in, check the Power quality response modes setting on the home page.



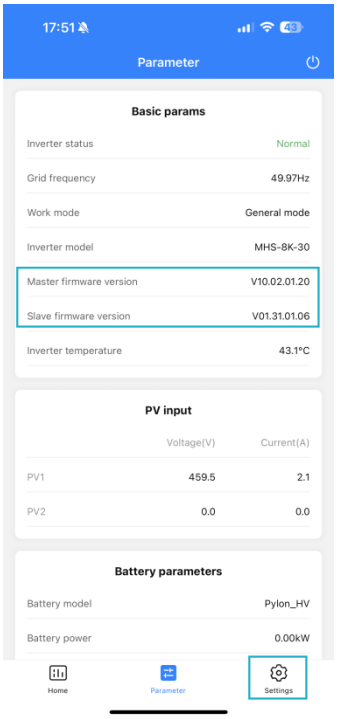
- **Grid Protection settings**

Click 'Grid connection parameter' on the Settings page to check the grid protection parameter settings



- **Inverter firmware version**

Check the Inverter firmware version on the parameter page.



5.5 Stop the Inverter

When turning off the inverter, please follow the steps below:

1. Shut down the inverter through the APP or the button on the display first.
2. Disconnect the breakers on the grid and load side.
3. Turn off the battery switch, and disconnect the DC breaker on the battery side (if any).
4. Wait 30 seconds and then turn the inverter DC switch to the OFF position. At this time, there is remaining power in the inverter capacitor. Wait for 10 minutes until the inverter is completely de-energized before operating.
5. If need to turn on the inverter after following above steps to stop the inverter, please turn on the AC breaker, battery breaker, battery switch and DC switch in turn, then the inverter will start.
6. If the inverter is not used for some time or never again, please disconnect the AC and DC cables. Please notice disconnection cables is only for disconnection and requires an electrician/trained approved personnel.

6 Operation

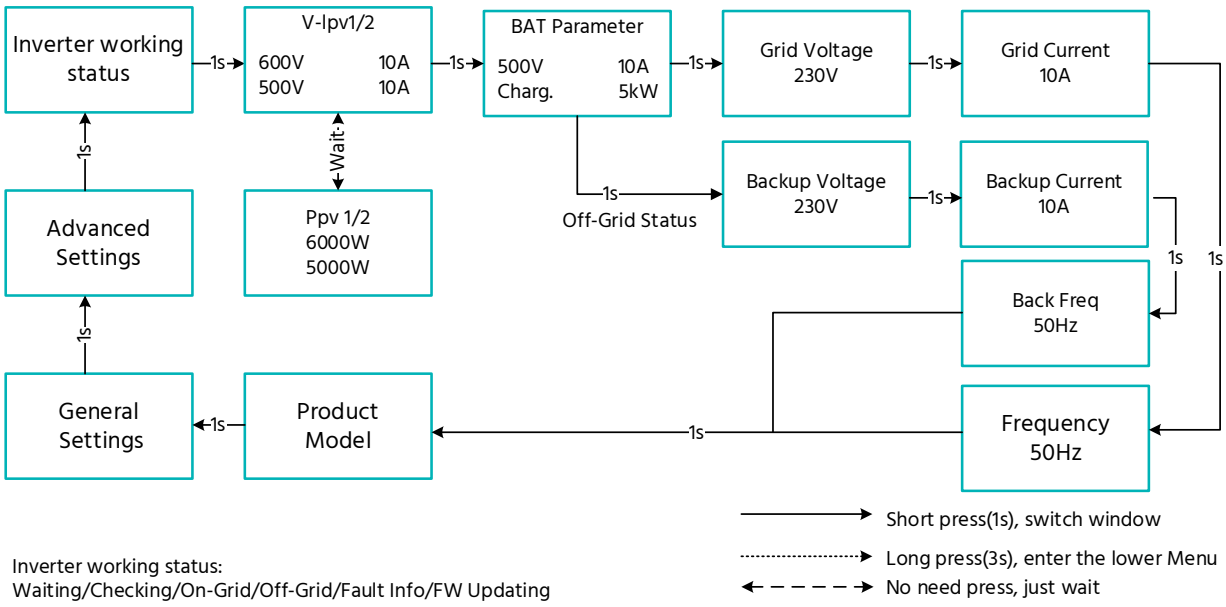
When the inverter is turned on, the following interfaces will be displayed on the OLED display, and the OLED display allows the user to check various operation information and to modify the settings of the inverter.

NOTE

Note: Short-press to change the parameter value; long-press to confirm the setting and move to the next parameter.

Please wait for 10 seconds and the inverter will automatically save your settings or modifications.

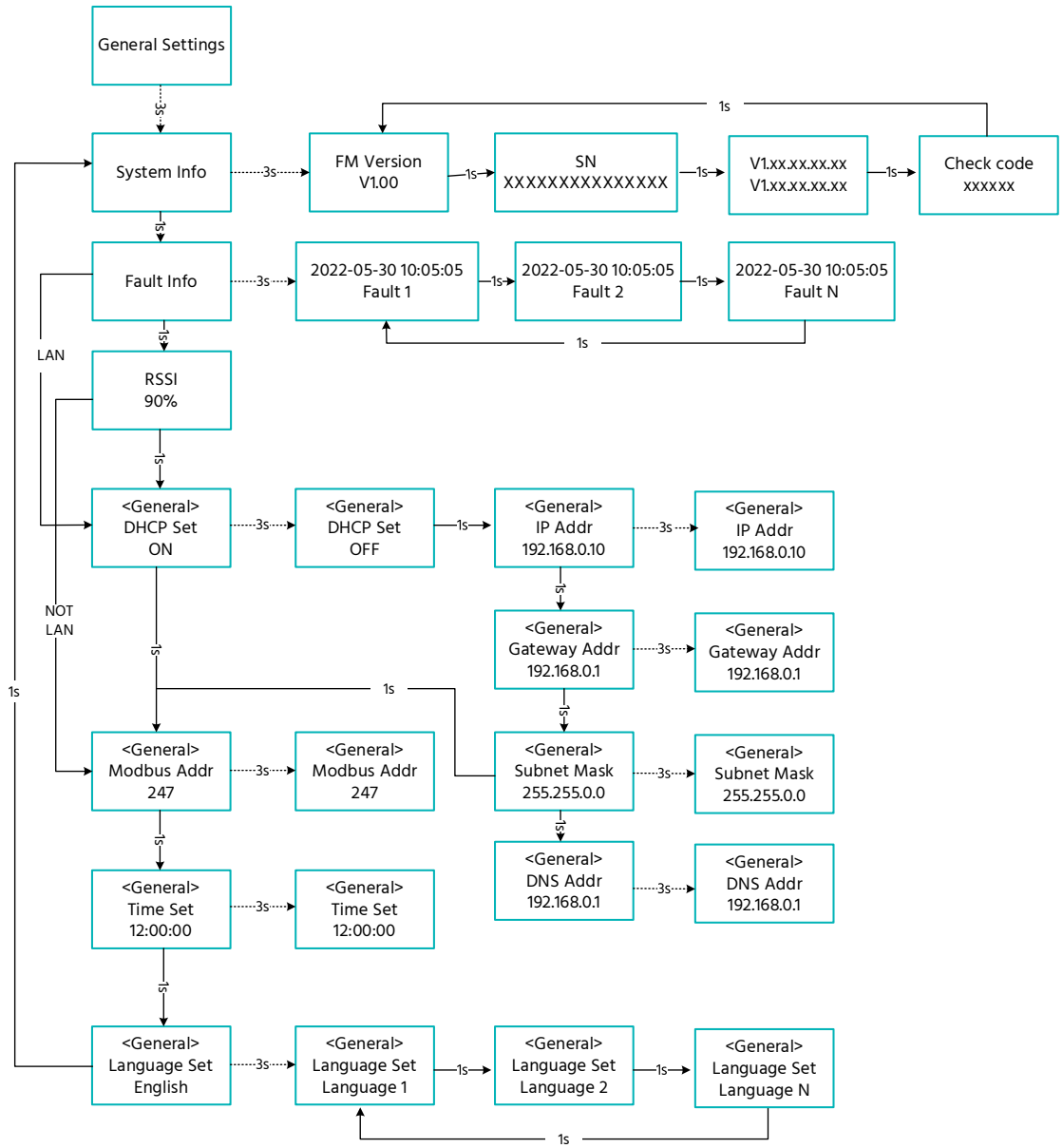
6.1 Main Window



Inverter Display Abbreviation and Complete Name Reference Table

Abbreviation	Complete Name
V-Ipv1/2	PV input voltage and current of each MPPT
Ppv1/2	PV input power of each MPPT
BAT Parameter	Battery Parameter
Charg.	Charge
Dischg.	Discharge
FW Updating	Firmware Updating

6.2 General Setting

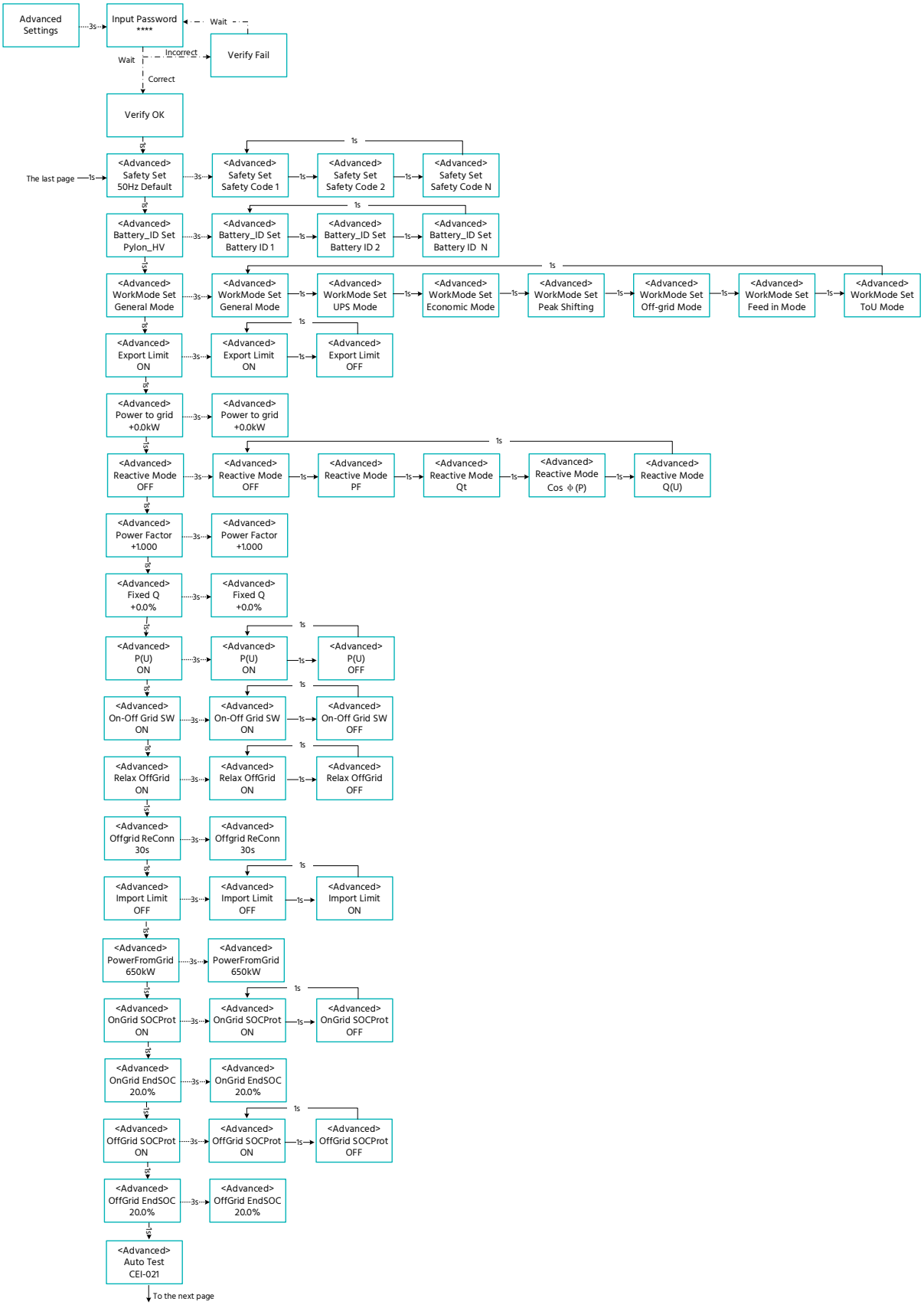


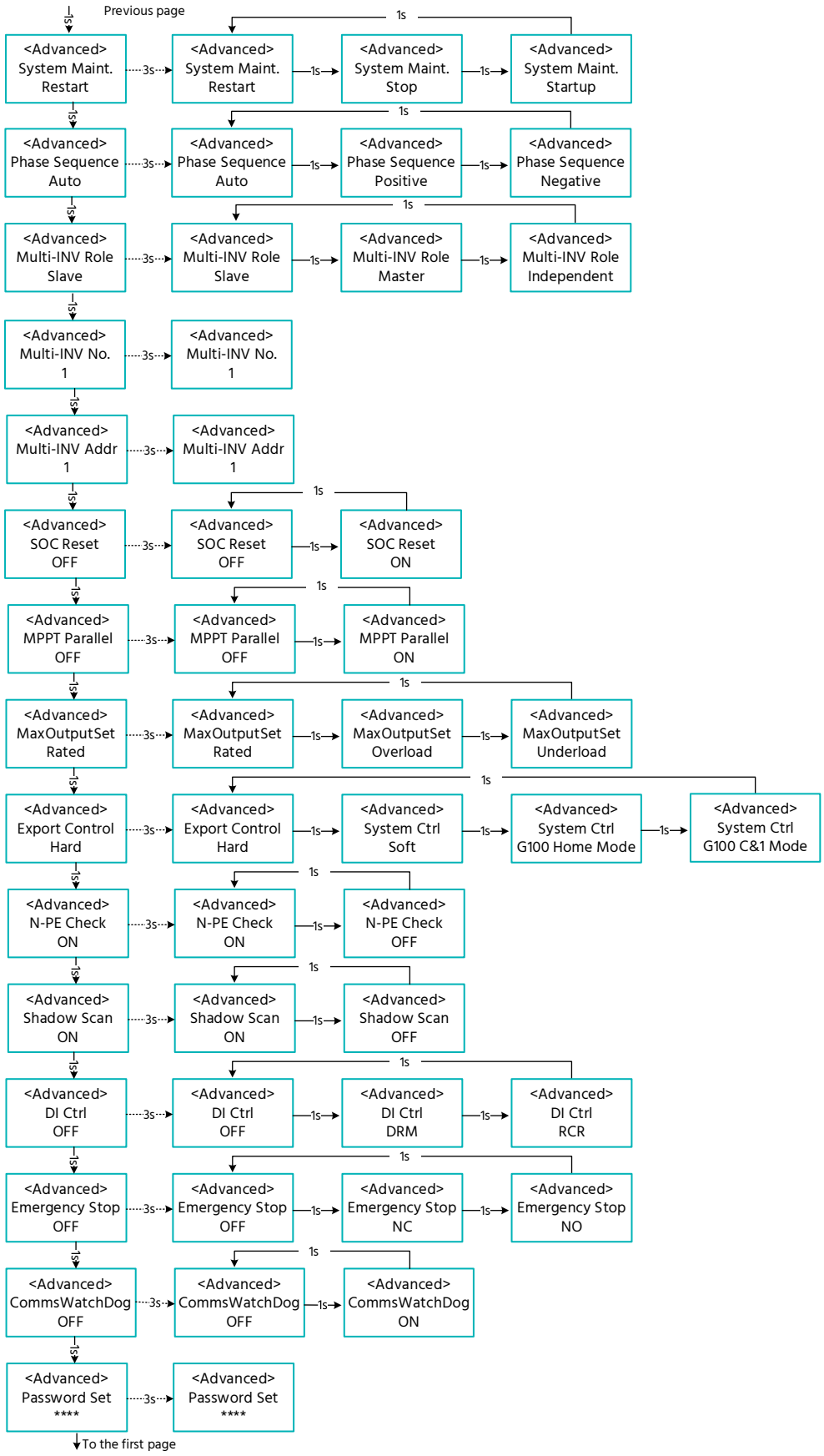
Inverter Display Abbreviation and Complete Name Reference Table

Abbreviation	Complete Name
System Info	System information
FM Version	Firmware version
SN	Series number

Fault Info	Fault information
RSSI	Received signal strength indicator
DHCP Set	Enable or disable DHCP functionality
IP Addr	If DHCP is turned off, set the static IP address
Gateway Addr	If DHCP is turned off, set the Gateway IP address
Subnet Mask	If DHCP is turned off, set the subnet mask
DNS Addr	If DHCP is turned off, set the domain name server address
Modbus Addr	Modbus address

6.3 Advanced Setting




Previous page
<Advanced> System Maint. Restart
<Advanced> System Maint. Restart
<Advanced> System Maint. Stop
<Advanced> System Maint. Startup
<Advanced> Phase Sequence Auto
<Advanced> Phase Sequence Auto
<Advanced> Phase Sequence Positive
<Advanced> Phase Sequence Negative
<Advanced> Multi-INV Role Slave
<Advanced> Multi-INV Role Slave
<Advanced> Multi-INV Role Master
<Advanced> Multi-INV Role Independent
<Advanced> Multi-INV No. 1
<Advanced> Multi-INV No. 1
<Advanced> Multi-INV Addr 1
<Advanced> Multi-INV Addr 1
<Advanced> SOC Reset OFF
<Advanced> SOC Reset OFF
<Advanced> SOC Reset ON
<Advanced> MPPT Parallel OFF
<Advanced> MPPT Parallel OFF
<Advanced> MPPT Parallel ON
<Advanced> MaxOutputSet Rated
<Advanced> MaxOutputSet Rated
<Advanced> MaxOutputSet Overload
<Advanced> MaxOutputSet Underload
<Advanced> Export Control Hard
<Advanced> Export Control Hard
<Advanced> System Ctrl Soft
<Advanced> System Ctrl G100 Home Mode
<Advanced> System Ctrl G100 C&1 Mode
<Advanced> N-PE Check ON
<Advanced> N-PE Check ON
<Advanced> N-PE Check OFF
<Advanced> Shadow Scan ON
<Advanced> Shadow Scan ON
<Advanced> Shadow Scan OFF
<Advanced> DI Ctrl OFF
<Advanced> DI Ctrl OFF
<Advanced> DI Ctrl DRM
<Advanced> DI Ctrl RCR
<Advanced> Emergency Stop OFF
<Advanced> Emergency Stop OFF
<Advanced> Emergency Stop NC
<Advanced> Emergency Stop NO
<Advanced> CommsWatchDog OFF
<Advanced> CommsWatchDog OFF
<Advanced> CommsWatchDog ON
<Advanced> Password Set ****
<Advanced> Password Set ****
To the first page
1s
3s

*Please contact Pylontech service team for password.

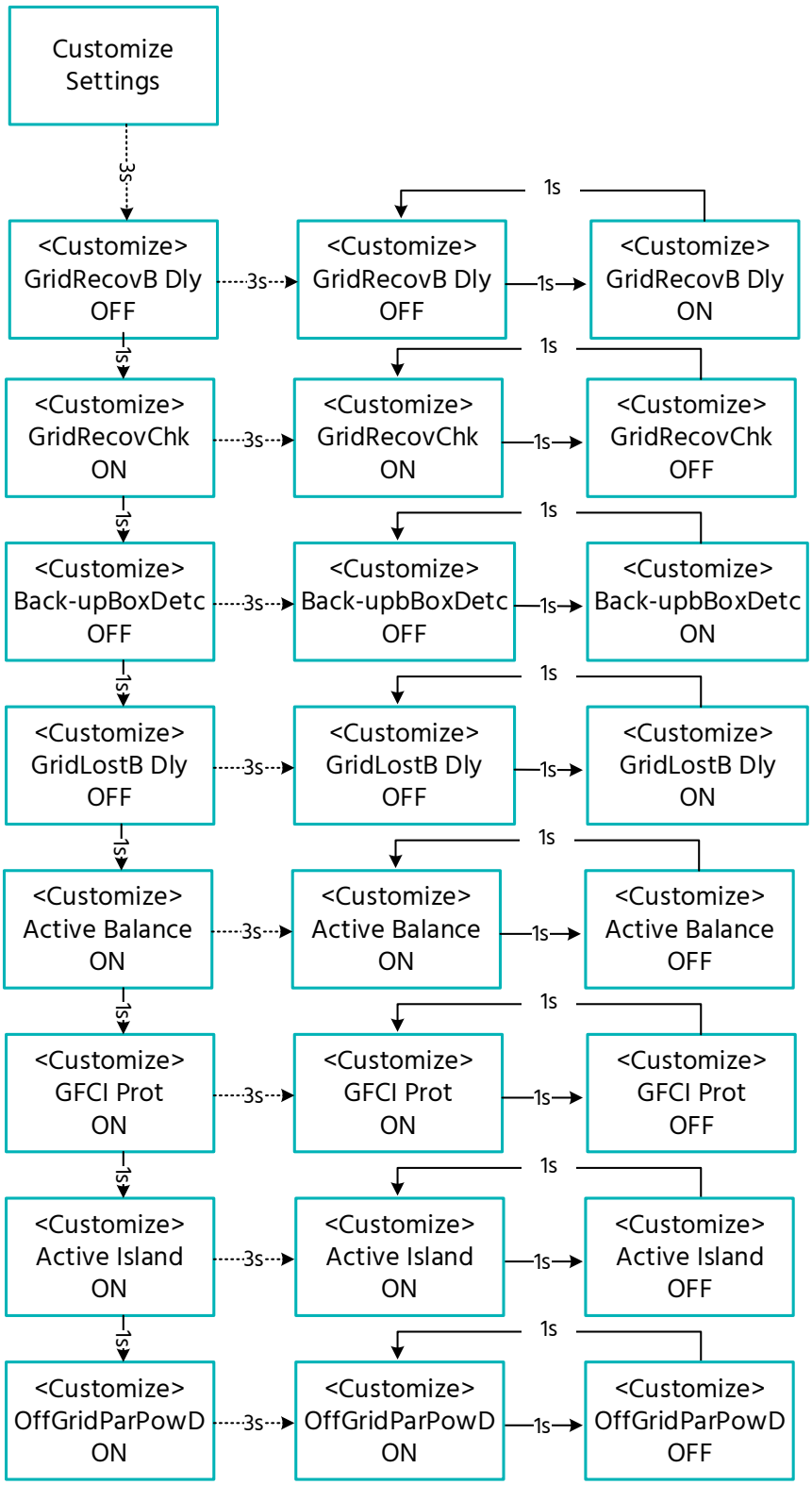
Inverter Display Abbreviation and Complete Name Reference Table

Abbreviation	Complete Name
Safety Set	Select the code that meet local regulatory requirements
Battery_ID Set	Select the battery model
Work Mode	Current work mode / work mode setting
Export Limit	On-grid export limit function switch
Power to grid	Set the power that is allowed to feed to the grid(under the condition of Export Limit is on)
Reactive Modes	Reactive Power Mode
PF	“Under ““Reactive Mode” “The reactive power can be regulated by the parameter PF (Power Factor).”
Qt	“Under ““Reactive Mode” “The reactive power can be regulated by the parameter Q-Var limits (in %).”
Cosφ(P)	“Under ““Reactive Mode” “The PF changes with the output power of the inverter.”
Q(U)	“Under ““Reactive Mode” “The reactive power changes with the grid voltage”
Fixed Q	The reactive power ratio when the “Reactive Mode” is Qt.
P(U)	Active power mode Switch. The active power changes with the grid voltage.
On-Off Grid SW	Off-grid function switch (If turn it on, the inverter will automatically switch to off-grid mode to ensure the back-up side power supply when the gird is abnormal or off, otherwise, there is no output on the back-up side)

Abbreviation	Complete Name
Relax OffGrid	Reduce the switching sensitivity of the On/Off-grid (applied to the places where the grid is unstable or inverter always entered off-grid mode for some reasons)
Offgrid ReConn.	When inverter is operating without grid, it will stop backup output after overload protection, and restart within the set time.
Import Limit	On-grid import limit function switch
Power From Grid	Set max allowed power from grid (under the condition of Import Limit is on)
OnGrid SocProt	On-grid battery SOC (State of Charge) Protection
OnGrid EndSOC	End-of-discharge SOC of on-grid
OffGrid SocProt.	Off-grid SOC Protection
OffGrid EndSOC	End-of-discharge SOC of off-grid
System Maint.	System maintenance, includes inverter stop and run, system restart
Sys Black Start	System can gradually recover from shutdown on its own mechanism without external power source.
Multi-INV Role	In the multi-inverter parallel system, set the role of one inverter as the master and the other inverter as the slave.
*Multi-INV No	This menu is displayed only when the inverter is Master. Set the number of master-slave parallel. Range:1~10.
**Multi-INV Addr	This menu is displayed only when the inverter is Slave.Set the address of slave inverter. Range: 1~9. The address will be “Auto” when “Multi-INV NO.” is “1”.
SOC Reset	When enabled, the battery will be automatically charged to calibrate the battery SOC. After the battery is charged, this function will be turned off automatically.
MPPT Parallel	If MPPT is connected in parallel, enable this function.
MaxOutputSet	Select the maximum AC output power.

Abbreviation	Complete Name
	Rated, Max. output power= Rated output power on the datasheet Overload, Max. output power= Max. output power on the datasheet Underload, Max. output power < Rated output power on the datasheet
Export Control	In the power export limit on mode, when the communication between the inverter and meter or the inverter and datalogger is interrupted, select the inverter operation mode from one of the follows: Hard, inverter stops Soft, inverter generates power as the “Feed in Grid” value set on the screen
N-PE Check	The N and PE shorting function on the BACK-UP side in the off-grid operation status.
Shadow Scan	Shadow Scan function switch
DI Ctrl	DI Ctrl enable “DRM” or “RCR” function
DRM	Demand Response Modes
RCR	Ripple Control Receiver
Emergency Stop	Emergency stop switch device
NO	Normally open: Emergency Switch Normally Open, when switch closed, inverter stop.
NC	Normally closed: Emergency Switch Normally Closed, when switch open, inverter stop.
CommsWatchDog	When the function is turned on, the inverter stops working when communication with the master is lost.

6.4 Customize Set



Item	Full Name	Description	Application scenarios
GridRecovB Dly	Grid recover back-up output delay function	When the inverter is switched from the off-grid state to the grid-connected state, the back-up side selects normal output or delayed output. OFF (default): Normal output (within 10ms) ON: Delay output (delay 500ms)	When the customer connects to an ATS that cannot self-recover between grid side and back-up side, the customer selects the delay mode and the output is delayed by 500 ms on back-up side, so that the ATS can be switched from back-up side to grid side.
GridRecov Chk	Grid recover self-check function	The inverter is self-test when it is switched from the off-grid state to the grid-connected state. ON (default): Self-test OFF: No self-test Notice: If turn this function off, it may not meet local grid connection regulations	In areas where utility grid is unstable, if utility grid is cut off again during the self-test process, the output on the back-up side will be interrupted.
Back-upBoxDetc	Back-up box detection function	Turn on this function, and the inverter will detect whether the backup box is operating normally OFF (default): Not detected ON: Perform tests Notice: In off-grid parallel system, this function is enabled by default	The function is automatically turned on in off-grid paralleled system. When backup box connected with single inverter, please manually turn on this function.
GridLostB Dly	Grid lost back-up output	When inverter is switched from grid-connected state and off-grid state, the back-up side is normal	When the system is connected to the shock load, the inverter may not be switched and work normally when grid-connection

Item	Full Name	Description	Application scenarios
	delay function	output or delayed output. OFF (default): Normal output ON: Delay output	state switched to off-grid state.and turning on the function can improve the probability of system restart.
Active Balance	Grid active balancing function	When there is no PV and no battery, whether the machine actively turns on the three-phase unbalance function to balance the power of the grid port. ON (default): turn on this function OFF: turn off this function	Turn the function on or off according to the grid requirements and needs
GFCI Prot	GFCI protection function	The leakage current protection function is turned on or off. ON (default): turn on this protection OFF: turn off this protection	When there is abnormal leakage current in the system, which causes the system to fail to operate normally, the function can be disabled. Notice: Before disabling this function, need to confirm that there are no security risks.
Active Island	Active islanding disturbance function	Active islanding disturbance function is turned on or off. ON (default): turn on this function OFF: turn off this function Notice: Active islanding disturbance function is turned off, and the passive islanding protection function is still available.	In some test scenarios, need to disable this function, but no operation is required for normal condition.

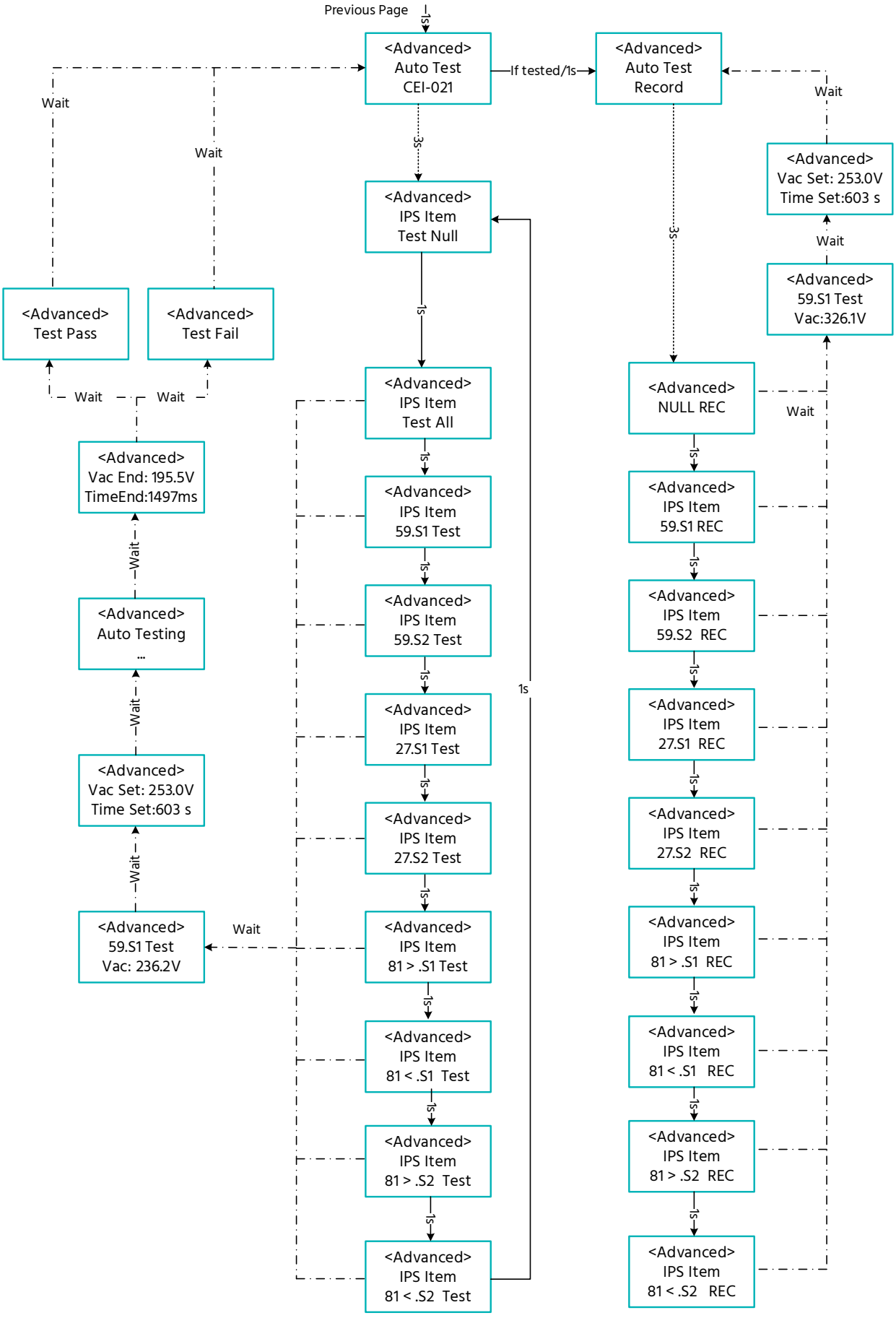
Item	Full Name	Description	Application scenarios
OffGrid ParPow D	Off-grid parallel power distribution function	When multiple inverters are off-grid paralleled, the master schedules and distributes the power of the slaves. ON (default): turn on this function OFF: turn off this function Notice: Active islanding disturbance function is turned off, and the passive islanding protection function is still available.	If the off-grid side of the parallel power station is together, the function needs to be turned on; If the off-grid side of the parallel power station is not combined, the function needs to be turned off. Under normal circumstances, the switch does not need to be operated, only the project is connected to the grid, and the standby side needs to be turned off when the load is connected independently.

6.5 Auto-Test

This function is disabled by default, and will be only functional in the safety code of Italy. Short press the button several times until "Auto Test CEI 0-21" displays on the screen, press and hold the button 3 seconds to activate "Auto Test". After the auto test is finished, short press the button several times until the screen displays "Auto Test Record", and hold the button 3 seconds to check the test results.

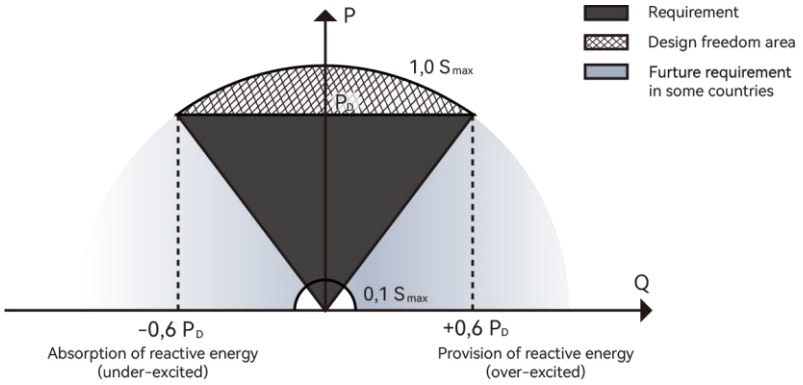
The auto test will start when the correct test item is selected, and the test result will be displayed on the screen when it finished. If the test was successful, it will display "Test Pass", otherwise will display "Test Fail". After each item tested, the inverter will reconnect to the grid and automatically start the next test according to the requirements of CEI 0-21.

Connect the AC cable, auto test will start after the inverter connected to the grid, see the operation steps below:


Previous Page
1s
<Advanced>
Auto Test
CEI-021
If tested/1s
<Advanced>
Auto Test
Record
Wait
Wait
Wait
3s
<Advanced>
IPS Item
Test Null
<Advanced>
Vac Set: 253.0V
Time Set:603 s
Wait
<Advanced>
59.S1 Test
Vac:326.1V
<Advanced>
Test Pass
<Advanced>
Test Fail
Wait
Wait
1s
<Advanced>
IPS Item
Test All
<Advanced>
NULL REC
Wait
<Advanced>
Vac End: 195.5V
TimeEnd:1497ms
<Advanced>
IPS Item
59.S1 Test
<Advanced>
IPS Item
59.S1 REC
Wait
<Advanced>
Auto Testing
...
<Advanced>
IPS Item
59.S2 Test
<Advanced>
IPS Item
59.S2 REC
Wait
<Advanced>
IPS Item
27.S1 Test
<Advanced>
IPS Item
27.S1 REC
Wait
<Advanced>
Vac Set: 253.0V
Time Set:603 s
<Advanced>
IPS Item
27.S2 Test
<Advanced>
IPS Item
27.S2 REC
Wait
<Advanced>
59.S1 Test
Vac: 236.2V
Wait
<Advanced>
IPS Item
81 > .S1 Test
<Advanced>
IPS Item
81 > .S1 REC
1s
<Advanced>
IPS Item
81 < .S1 Test
<Advanced>
IPS Item
81 < .S1 REC
<Advanced>
IPS Item
81 > .S2 Test
<Advanced>
IPS Item
81 > .S2 REC
<Advanced>
IPS Item
81 < .S2 Test
<Advanced>
IPS Item
81 < .S2 REC

6.6 Reactive Power

The inverter provides a reactive power regulation function.



This mode can be enabled via configuration software. It is enabled by default in some regions, such as AU, DE market. For information on how to change default setpoints please contact Pylontech.

Descriptions of reactive power regulation mode:

Mode	Descriptions
Off	The PF is fixed at +1.000.
PF	The reactive power can be regulated by the parameter PF (Power Factor).
Qt	The reactive power can be regulated by the parameter fixed Q (in Pn%).
Cosφ(P)	The PF changes with the output power of the inverter.
Q(U)	The reactive power changes with the grid voltage.

6.6.1 "Off" Mode

The reactive power regulation function is disabled. The PF is limited to +1.000.

6.6.2 "PF" Mode

The power factor is fixed and reactive power setpoint is calculated according to the current power. The PF ranges from 0.8 leading to 0.8 lagging.

Leading: the inverter is sourcing reactive power to the grid.

Lagging: the inverter is injecting reactive power into the grid.

"PF" mode is named "[c] Fixed power factor" in AS/NZS 4777.2 Chapter 3.3 "Power quality response mode".

6.6.3 "Qt" Mode

In the Qt mode, system rated reactive power is fixed, and the system injects reactive power according to the delivered reactive power ratio.

The setting range of the reactive power ratio is -60%~60%, corresponding to the ranges of inductive and capacitive reactive power regulation respectively.

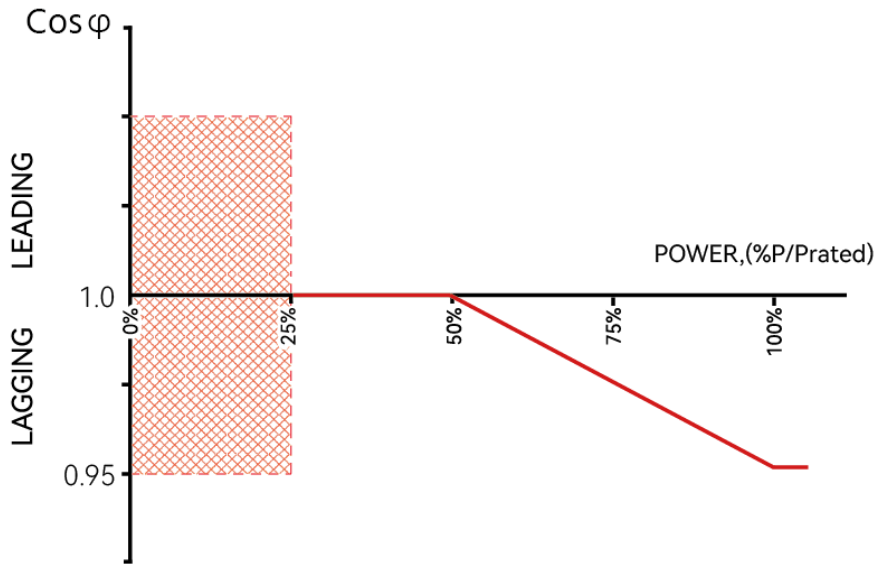
"Qt" Mode is named "[d] Reactive power mode" in AS/NZS 4777.2 Chapter 3.3 "Power quality response mode".

6.6.4 "Cosφ(P)" Mode

The PF of the inverter output varies in response to the output power of the inverter. "Cosφ(P)" Mode Parameter Descriptions:

Parameter	Explanation	Range
Cosφ(P)_P1(Point A)	Output power at P1 on the Cosφ(P) mode curve (in percentage)	10% ~ 100%
Cosφ(P)_P2(Point B)	Output power at P2 on the Cosφ(P) mode curve (in percentage)	20% ~ 100%
Cosφ(P)_P3(Point C)	Output power at P3 on the Cosφ(P) mode curve (in percentage)	20% ~ 100%
Cosφ(P)_K1(Point A)	Power factor at P1 on the Cosφ(P) mode curve	0.8 ~1
Cosφ(P)_K2(Point B)	Power factor at P2 on the Cosφ(P) mode curve	
Cosφ(P)_K3(Point C)	Power factor at P3 on the Cosφ(P) mode curve	
Cosφ(P)_Enter-Voltage	Voltage percentage for Cosφ(P) function activation	100% ~ 110%
Cosφ(P)_Exit-Voltage	Voltage percentage for Cosφ(P) function	90% ~ 100%

	deactivation	



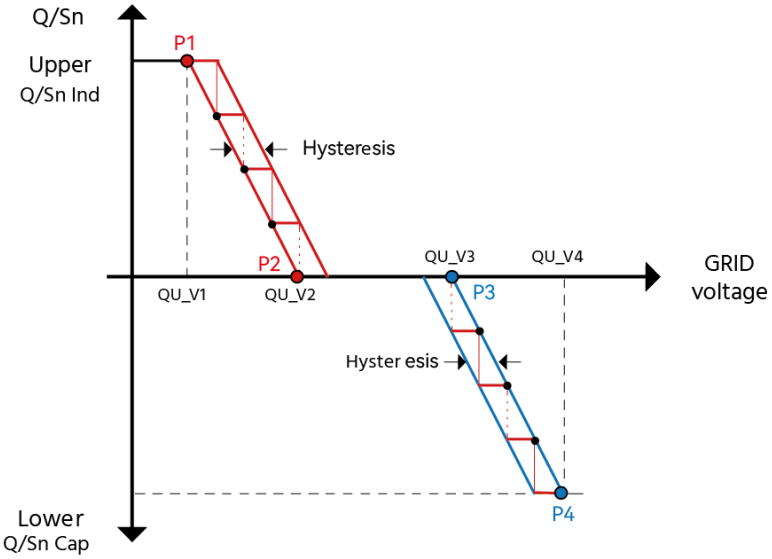
6.6.5 "Q(U)" Mode

The reactive power output of the inverter will vary in response to the grid voltage. "Q(U)" Mode Parameter Descriptions:

"Q(U)" Mode is named "[a] Volt-var response mode" in AS/NZS 4777.2 Chapter 3.3 "Power inductive and capacitive reactive power regulation respectively. quality response mode".

Parameter	Explanation	Range
QU_V1	Grid voltage limit at P1 on the Q(U) mode curve	80% ~ 100%
QU_Q1	Value of Q/Sn at P1 on the Q (U) mode curve	0 ~ 60%
QU_V2	Grid voltage limit at P2 on the Q(U) mode curve	80% ~ 100%
QU_Q2	Value of Q/Sn at P2 on the Q (U) mode curve	-60% ~ 60%
QU_V3	Grid voltage limit at P3 on the Q(U) mode curve	100% ~120%
QU_Q3	Value of Q/Sn at P3 on the Q (U) mode curve	-60% ~ 60%
QU_V4	Grid voltage limit at P4 on the Q(U) mode curve	100% ~120%
QU_Q4	Value of Q/Sn at P4 on the Q(U) mode curve	0 ~ 60%

QU_Enter-Power	Active power for Q(U) function activation	20% ~ 100%
QU_Exit-Power	Active power for Q(U) function deactivation	1% ~ 20%

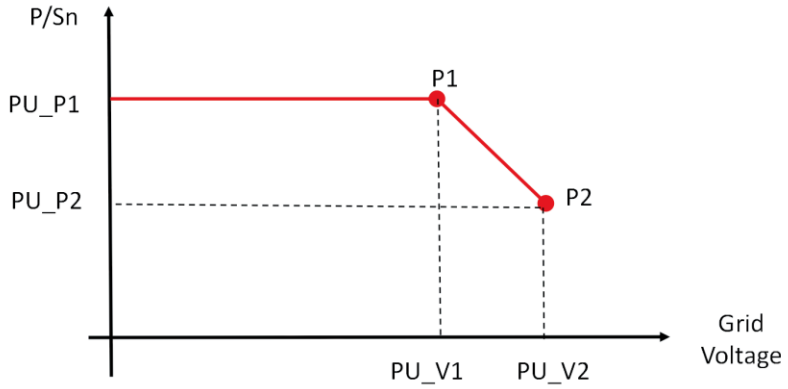


6.7 Active Power

The active power output of the inverter varies in response to the grid voltage. It is enabled by default in some regions, such as AU, EU market. “P(U)” Mode is named “[b] Volt-watt mode” in AS/NZS 4777.2 Chapter 3.3 “Power quality response mode”.

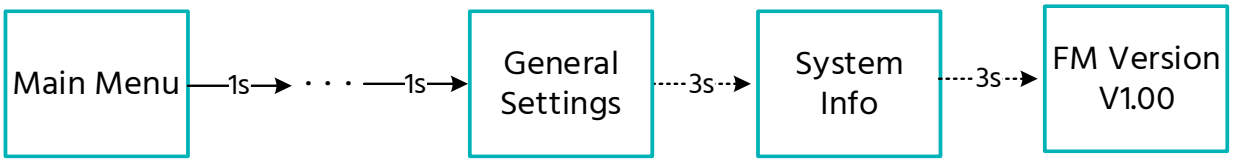
“P(U)” Mode Parameter Descriptions:

Parameter	Explanation	Range
PU_V1	Grid voltage limit at P1 on the P(U) mode curve	100% ~120%
PU_P1	Value of P/Sn at P1 on the P (U) mode curve	0 ~ 100%
PU_V2	Grid voltage limit at P2 on the P(U) mode curve	100% ~120%
PU_P2	Value of P/Sn at P2 on the P (U) mode curve	0 ~ 100%
PU(τ)	Time constant of the P(U) mode curve	0~60s



6.8 Check Firmware Version

The flow chart how to check firmware version on OLED display is following



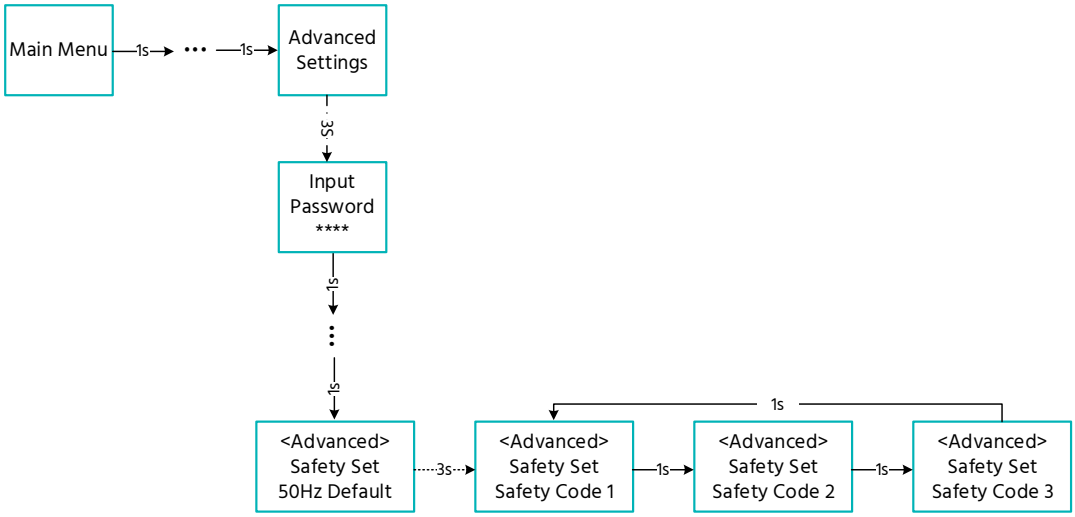
6.9 Grid Parameter

6.9.1 Check and Select Grid Code via OLED Display

The inverter can check and select grid code (region) for grid protection via OLED display. Please enter the password to select grid code. To obtain the password, please contact Pylontech.

Once Grid Code have been selected at commissioning these settings will be locked from editing (unless with Password).

The flow chart how to check and select on the OLED display is following.

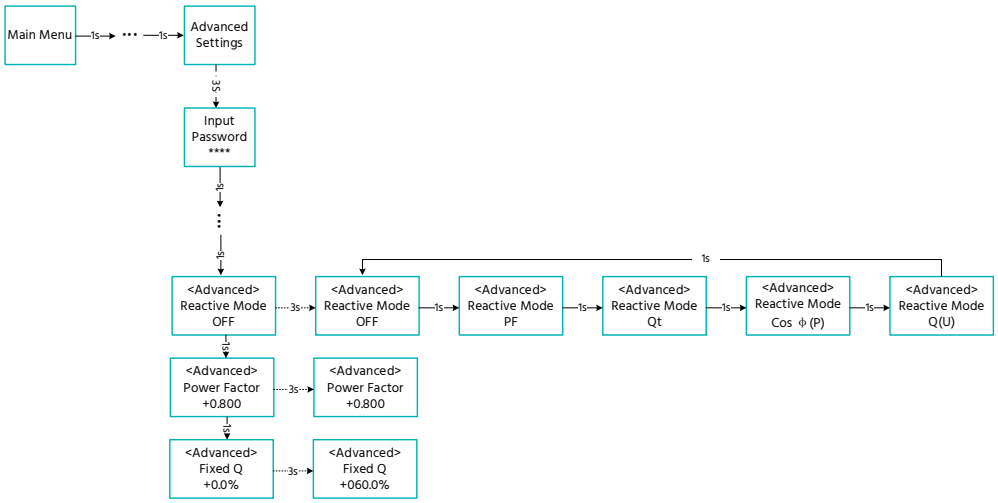


6.9.2 Check and Select Reactive and Active Modes via OLED Display

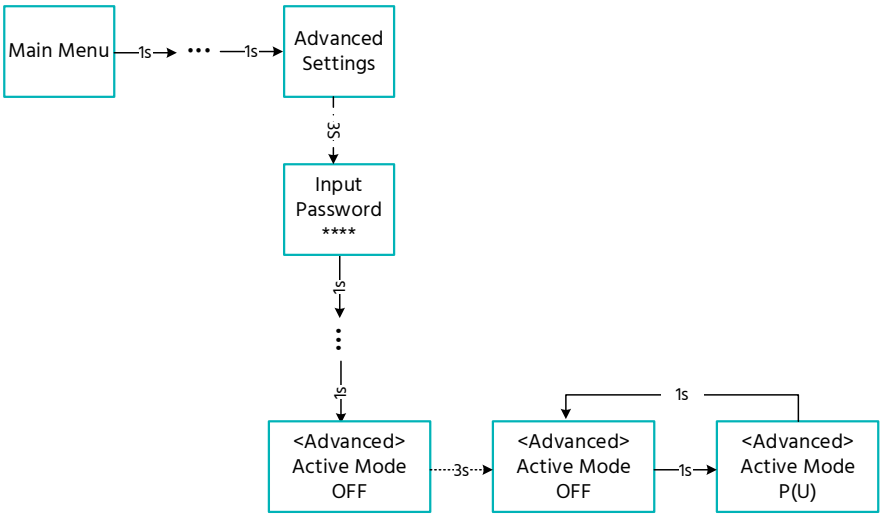
Inverter can check and select Reactive and Active Modes (Power Quality Response Modes) via OLED display. Please enter the password to check and select Reactive and Active Modes. To obtain the password, please contact Pylontech.

Once Reactive and Active Modes have been selected at commissioning these settings will be locked from editing (unless with Password).

The flow chart how to check and select Reactive modes on OLED display is following.



The flow chart how to check and select Active Mode (including P(U) mode) on OLED display is following.

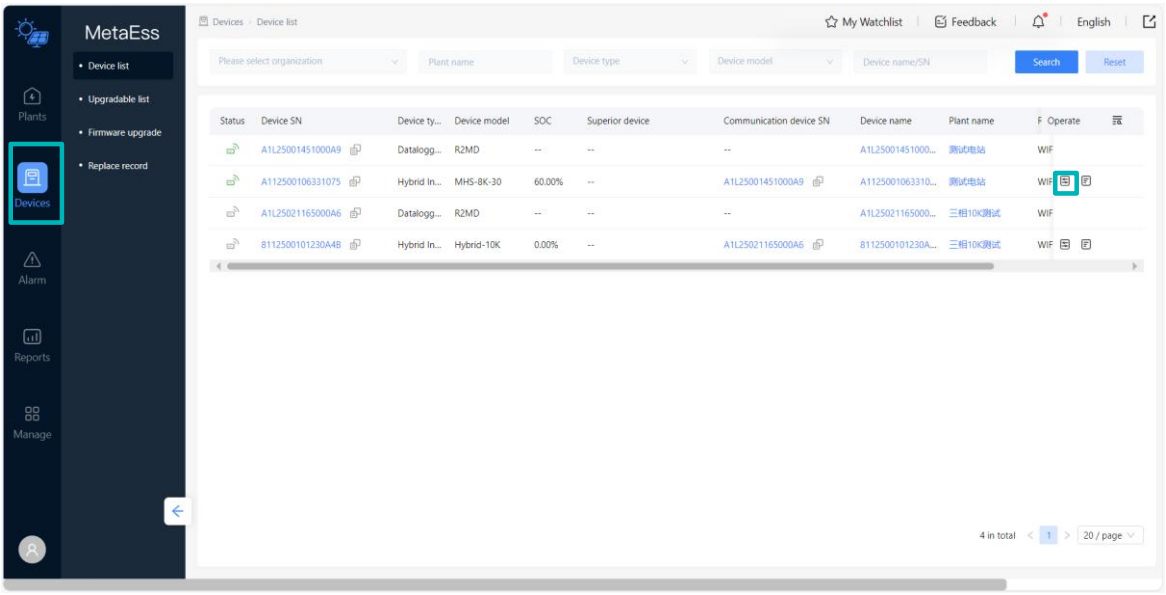


6.9.3 Check and Adjust Grid Code, Reactive and Active Modes Setpoints

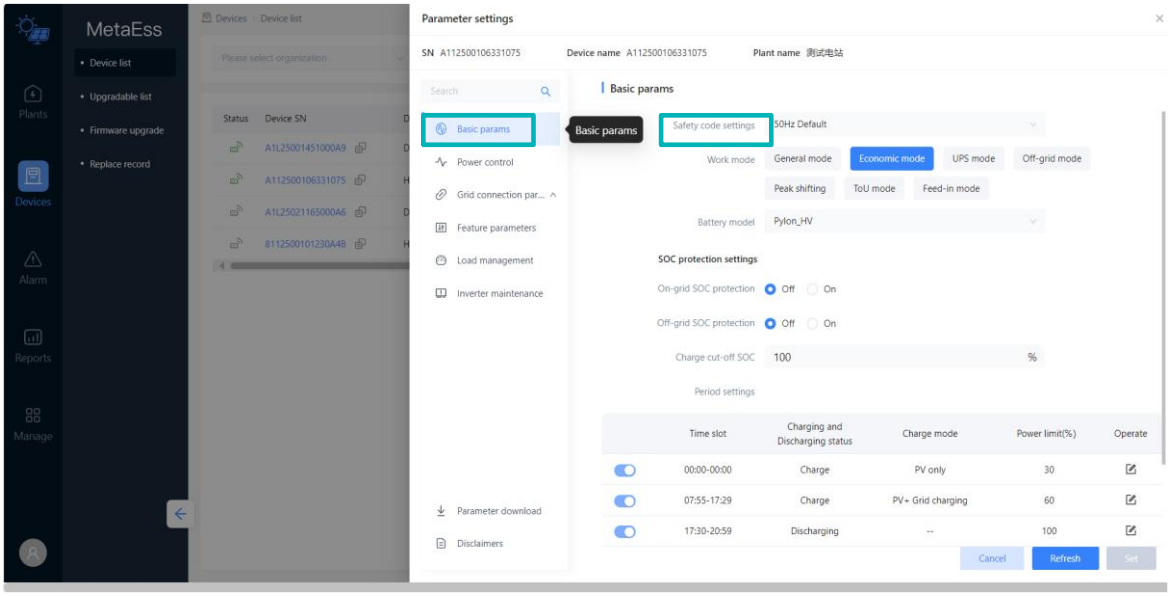
The inverter can check and adjust grid code, reactive and active modes setpoints via monitoring platform.

The following pictures how to check and adjust on the monitoring platform is following.

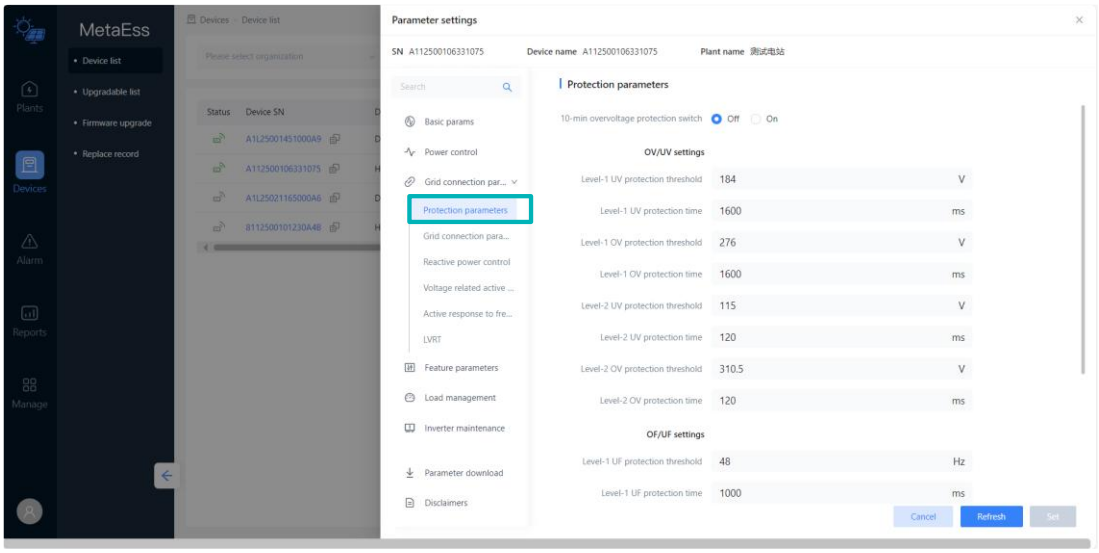
1. On the monitoring interface, click “**Device list**” in the “**Devices**” drop-down menu. Click “**Configure**” in “**Operate**” in the column of the device set.



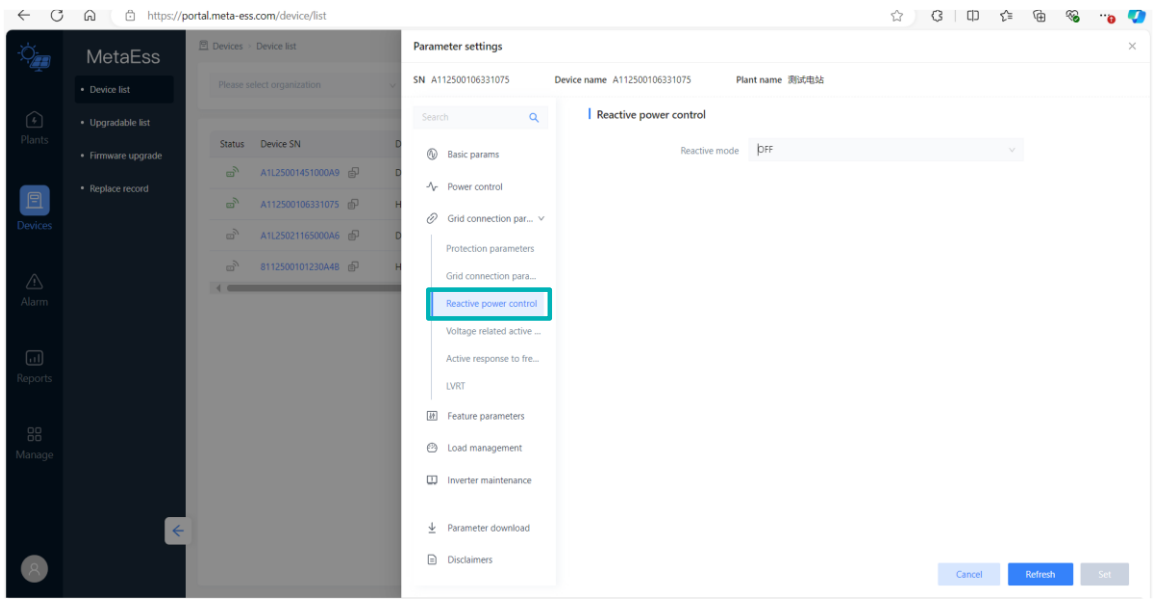
2. Enter “**Basic params**” menu and check “**Safety code settings**” (Grid Code).



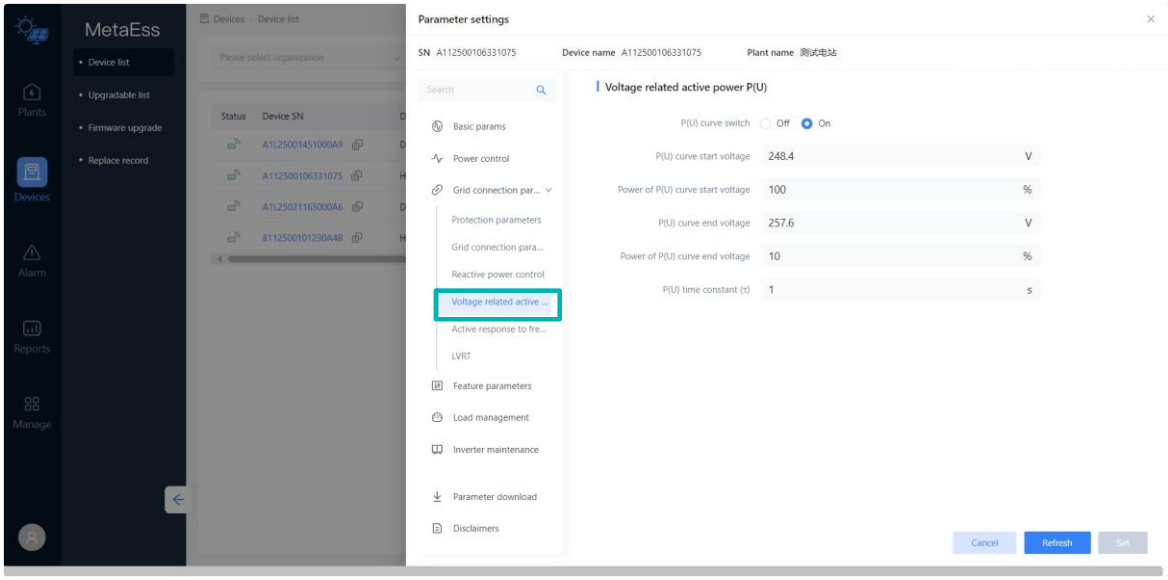
3. Enter “**Protection parameters**” and “**Grid connection parameter**” menu under “**Grid connection parameter**” and check grid protection settings setpoints.



4. Enter “Reactive power control” menu under “Grid connection parameter” menu and check reactive mode setpoints.



5. Enter “**Voltage related active power P(U)”** menu under “**Grid connection parameter**” menu and check active mode setpoints.

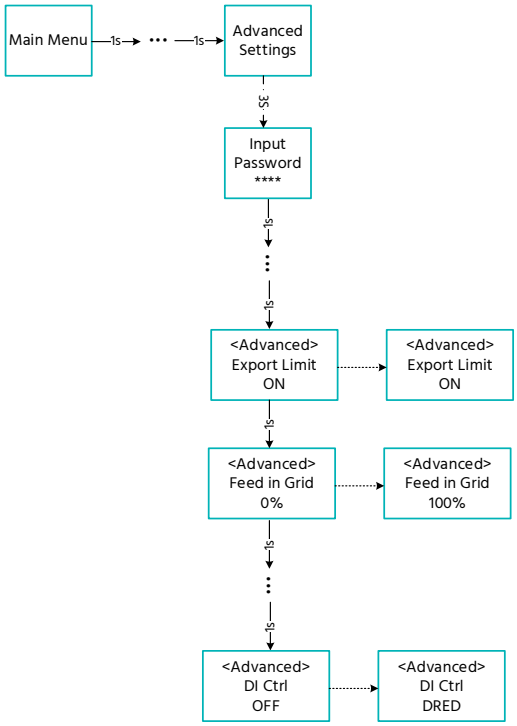


6.10 DI Ctrl

6.10.1 DRED

DRED function needs to be enabled via the OLED display.

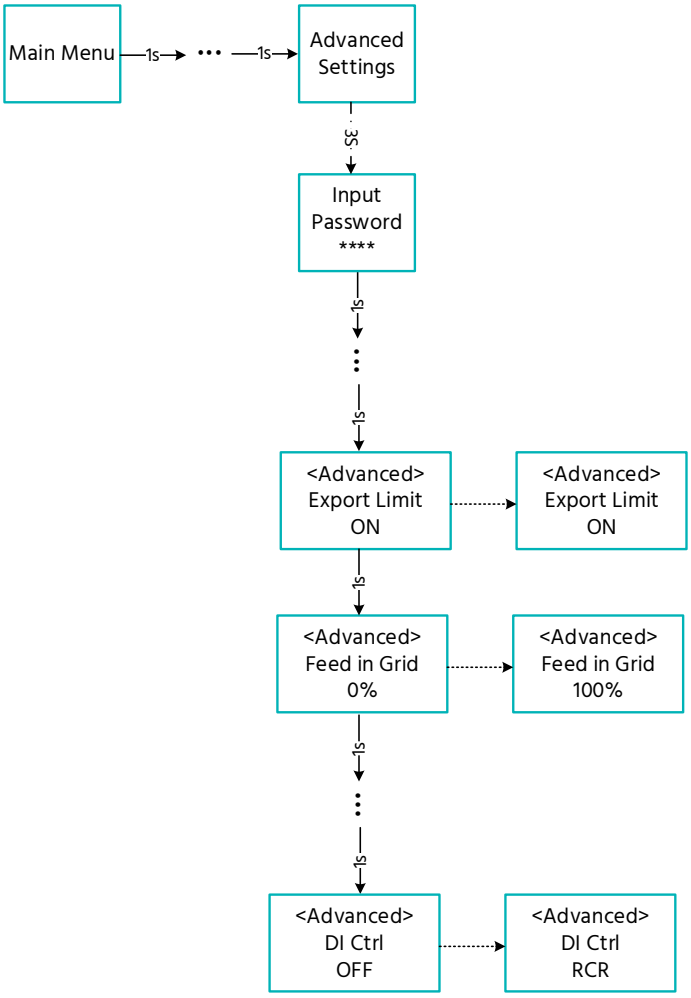
First, set “Export Limit” to “ON” and set “Feed in Grid” to “100%”. Then set “DI Ctrl” to “DRED”.



6.10.2 RCR

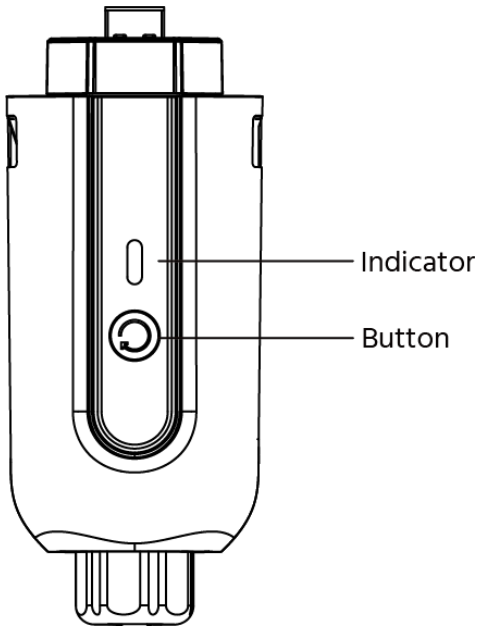
RCR function needs to be enabled via the OLED display.

First, set “Export Limit” to “ON” and set “Feed in Grid” to “100%”. Then set “DI Ctrl” to “RCR”.



7 Monitoring

7.1 Monitoring Device



Button	Description	
	Press the Button less than 5s: Restart	
	Press the Button more than 5s: Reset (Delete the previous configuration)	
	OFF	Connection abnormal
	Slowly flashing	The Communication Module is not connected to the router.
	Quickly flashing	The Communication Module is connected to the router but not connected to the server.
	Always on	The Communication Module is normal working.

NOTE

Note: The Wi-Fi module needs to be configured to the router for the first installation. If the router name or password are changed, the Wi-Fi devices will need to be reconfigured.

If DHCP is enabled on the router, the LAN version module does not need to be configured.

7.2 Cloud Monitoring

The inverter provides a monitoring port that can collect and transmit data from the inverter to monitoring platform via an external communication module. MetaEss APP also includes a local Bluetooth configuration function.

MetaEss Download QR Code

If download issues exist, contact your dealer or Pylontech service team.

Cloud monitoring web link: https://portal.meta-ess.com/login.

Troubleshooting

Hybrid inverter is designed in accordance with grid operation standards, and conform to the requirements of safety and EMC. The inverter had passed a series of rigorous tests to ensure it runs sustainably and reliably before shipment.

7.3 Status Code in Waiting

Code	Description
S01	WorkMode Not Set
S02	Emergency Stop Enable
S03	DC Conditions Unsatisfied
S04	Grid Voltage and Frequency Out Of Allowable Range
S05	Off-grid Switch Not Enabled In Off-grid
S06	No battery In Off-grid
S07	Operation Stopped By Command
S08	SOC Low and PV No Input
S09	Comm. interruption of the slave unit in parallel connection.
S10	Meter comm. interruption under Hard control of export limit.
S11	Waiting for Bypass State
S12	Updating Non-Power-Down Standby State
S13	Diesel Generator Fault
S15	Off-grid Status
S16	Updating Non-Power-Down Flag Clearing
S17	Command Power Limit
S18	Over Frequency Power Limit
S19	Over Temperature Power Limit

S20	Over Current Power Limit
S21	Reactive Power Limit
S22	Feed in Grid Power Limit
S23	Slow Loading
S24	Overvoltage Power Limit
S25	System Power Limit
S26	EMS Command Limitation
S32	PV Power Limited

7.4 Error Message

Hybrid inverter is designed in accordance with grid operation standards, and conform to the requirements of safety and EMC. The inverter had passed a series of rigorous tests to ensure it runs sustainably and reliably before shipment.

When a fault occurs, the corresponding error message will be shown on the OLED display, and in this case, the inverter might stop feeding into grid. The fault messages and their corresponding troubleshooting methods are listed below:

Error Message	Description	Solution
Mains Lost	Grid power outage, AC switch or circuit is disconnected.	1. Check whether the mains supply is lost. 2. Check whether the AC breaker and terminal are well connected.
Grid Voltage Fault	Inverter detects that the gird voltage exceeds the limit of selected safety set range.	1. Check whether the safety code is correct. 2. Check whether the AC cable wiring is correct. 3. Check whether the voltage increased cause by large AC cable impedance. In this case we could replace with a thicker AC cable. 4. Extend the voltage protection limit with the permission of the Electricity Authority.

Error Message	Description	Solution
Grid Frequency Fault	Grid over frequency or underfrequency, the grid frequency is higher or lower than the set protection value.	1. Check whether the AC cable is correct and well connected. 2. Change to another country with wider protection range if it's allowed by the local electricity company.
DCI Fault	Inverter detects that the the direct current injection value exceeds the range.	1. Restart the inverter. 2. Seek for help from the installer or manufacture.
ISO Over Limitation	Inverter detects that DC side's insulation impedance to the ground is too low.	1. Check whether PV panels, cables, and connectors are waterlogged or damaged. 2. Use a megger to measure ground resistance on the DC side, and the measured value should not be less than 500 K Ω. 3. Seek help from the installer or manufacture.
GFCI Fault	The inverter detects that the ground leakage current exceeds the limitation.	1. Restart the inverter. 2. Check whether the PV panels, cables, and connectors are waterlogged or damaged. 3. Seek help from the installer or manufacture.
PV Over Voltage	PV input voltage exceeds the upper limit.	Reduce the number of PV panels to make sure that the open-circuit voltage of each string is lower than the inverter maximum allowed input voltage.
Bus Voltage Fault	The voltage of bus circuit is too high	1. Check whether the input voltage exceeds the limit. 2. Restart the inverter. 3. Seek help from the installer or manufacture.
Inverter Over Temperature	The inverter detects its high internal	1. Check whether the inverter installation location is well ventilated.

Error Message	Description	Solution
	temperature	2. Try to turn it off for a while, and then power it back on when it cools down. 3. Seek help from the installer or manufacture.
N-PE Check Fault	The ground cable is loose or in poor connection	Check whether the ground cable wiring is correct.
SPI Fault	Internal communication got failed. Caused by a strong external magnetic field etc.	1. Restart the inverter. 2. Seek help from the installer or manufacture.
E2 Fault	Internal storage got abnormal. Caused by a strong external magnetic field etc.	1. Restart the inverter. 2. Seek help from the installer or manufacture.
GFCI Device Fault	GFCI device got abnormal	1. Restart the inverter. 2. Seek for help from the installer or manufacture.
AC Transducer Fault	AC transducer got abnormal	1. Restart the inverter. 2. Seek for help from the installer or manufacture.
Relay Check Fail	Self-checking of internal relay got failed. Neutral & ground cable are in poor connection on AC side.	1. Use multimeter to measure the voltage between N&PE cable on AC side. If the voltage is higher than 10V, which means the neutral or ground connection is abnormal. 2. Restart the inverter. 3. Seek help from the installer or manufacture.
Internal Fan Fault	Inverter's internal fan got failed	1. Restart the inverter. 2. Seek for help from the installer or manufacture.

Error Message	Description	Solution
External Fan Fault	Inverter's external fan got failed.	Check whether the fan is blocked by foreign matters, clean them if necessary.
Bat OV	Battery protection got triggered	1. Check working status of battery. 2. Check if battery is alarming.
Backup OV	Abnormal voltage exists on the back-up side	Turn off inverter and remove the back-up connector. Use a multimeter to measure whether there is voltage existing on the back-up connector.
Bus Volt Low	Abnormal power scheduling	Check whether the battery voltage or PV input voltage is normal
Hard Fault	Hardware protection got triggered	1. Restart the inverter. 2. Seek help from the installer or manufacture.
Backup OP	Output power over limitation on back-up side	Check whether the load power on back-up side exceeds the maximum output power of inverter.
Inverter OV	The load power exceeds the range of its limit of inverter in off-gird mode	1. Check whether there is an impact load on the back-up side and whether the load power is too high. 2. Check whether back-up side is short circuit.
Inverter OF	The load power exceeds the range of its limit of inverter in off-gird mode	1. Check whether there is an impact load on the back-up side and whether the load power is too high. 2. Check whether back-up side is short circuit.
Inverter OC	The load power exceeds the range of its limit of inverter in off-gird mode	1. Check whether there is an impact load on the back-up side and whether the load power is too high. 2. Check whether back-up side is short circuit.
SCI Fault	Internal communication got	1. Restart the inverter. 2. Seek help from the installer or manufacture.

Error Message	Description	Solution
	failed. Caused by a strong external magnetic field etc.	
FLASH Fault	Internal storage anomaly. Caused by a strong external magnetic field etc.	1. Restart the inverter. 2. Seek help from the installer or manufacture.
Meter Comm Fault	Abnormal communication between meter and inverter.	1. Check whether the communication connection between inverter and meter is reliable 2. Confirm whether the meter model is compatible
BMS Comm Fault	Abnormal communication between inverter and battery BMS.	1. Check whether the battery ID selection is correct. 2. Check whether the communication connection between inverter and BMS is reliable 3. Check the working status of battery.

7.5 Inverter Maintenance

⚠ DANGER

Danger:

Incorrect operation do cause the risk of inverter damage or personal injury.

Please strictly follow the steps below.

1. Select 'stop' option on inverter screen or monitoring app to shut down inverter.
2. Turn off the AC breaker on utility grid side.
3. Turn off inverter DC switch.
4. Turn off the battery switch, and disconnect the DC breaker on the battery side (if any).
5. Wait for 10 minutes to ensure the energy of capacitor is fully dissipated.

6. Confirm all the indicator lights are off.

⚠ CAUTION

Caution: Keep unprofessional person away.

A temporary alarm sign or barrier must be posted to keep unprofessional person away while performing electrical connection and maintenance.

NOTICE

Notice:

Any arbitrary replacement of internal components is forbidden.

Please seek help from Pylontech for maintenance support. Otherwise, we will not take any responsibility.

NOTE

Note: Please remember not to do the self-maintenance before being familiar with the proper instruction of the whole process.

Items	Methods	Period
System clean	Check dust or foreign matter on the heat-sink, air inlet and outlet.	Once 6-12 months
Electrical connection	Check whether the cables are in good connection.	Once 6-12 months
Sealing	Check whether all the terminals and ports are properly sealed. Re-seal the cable hole if it is aging or not sealed.	Once a year

7.6 Battery Maintenance

Installation and maintenance of batteries should be performed or supervised with professional knowledge about batteries.

Please contact Pylontech for detailed installation and maintenance information.

⚠CAUTION

Caution: Do not dispose battery in fire, or it may explode.

Do not dismantle or break the battery. The electrolyte inside would be harmful to your body.

⚠CAUTION

Caution:

The battery has risk of electrical shock; the following scenario s-hould be noticed during the operation.

1. Remove metal items from your body.
2. Use insulated tools.
3. Remove metal items from battery.
4. Turn off the DC breaker of the battery before assembling or disassembling battery terminals.
5. There is a risk of electrical shock if battery is unexpectedly grounded. Remove the grounding cable to avoid the electrical shock.

7.7 Earth Fault Alarm

When the PV array occur earth fault, the inverter will report the following alarm information.The alarm system shall continue until the earth fault is corrected.

1. The warning indicator shows red constantly, and the OLED display will display “ISO Over Limitation” or “GFCI Fault”.
2. The monitoring platform and APP will show warning messages. Users can set up to receive alarm information via E-Mail.

NOTICE

Notice:

Please ensure the inverter is installed in a high traffic area where the visual alarm(warning indicator) will be noticed.

8 Appendix

8.1 Technical Parameters

Model	FHM-5K-HY-1P	FHM-8K-HY-1P
PV Input		
Start-up voltage (V)	80	80
Max. DC input voltage (V)*	600*	600*
Rated DC input voltage (V)	360	360
Minimum operating DC voltage（V）	100	100
MPPT voltage range (V)*	100-550*	100-550*
No. of MPPT trackers	2	2
No. of DC inputs per MPPT	1/1	1/1
Max. input current (A)	15/15	15/15
Max. short-circuit current (A)	20/20	20/20
Backfeed current to the array (A)	0	0
Battery Side		
Battery type	Lithium Battery (with BMS)	
Battery communication mode	CAN/RS485	CAN/RS485
Battery voltage range (V)	85-450	85-450
Maximum charging current (A)	30	30
Maximum discharge current (A)	30	30
Short circuit current rating for the Battery input***（A）	63	63
Grid Side		
Rated output power (kW)	5.0[1]**	8.0
Max. output power (kW)	5.5[2]**	8.0
Rated output apparent power (kVA)	5.0[3]	8.0
Max. output apparent power (kVA)	5.5[4]**	8.0
Max. input apparent power (kVA)	10.0	12.0
Max. charging power of battery (kW)	5.0	8.0
Rated AC voltage (V)	L/N/PE, 220/230/240V	

Model	FHM-5K-HY-1P	FHM-8K-HY-1P
Rated AC frequency (Hz)	50/60	50/60
Rated output current (A)	21.7[5]	36.3
Max. output current (A)	25.0[6]**	36.3
Max. input current (A)	43.5	52.2
The measured inrush current(A)	13A@25us	13A@25us
Max. output fault current(A)	85.0	85.0
Max. output overcurrent protection (A)	79.0	79.0
Power factor	0.8 leading ...0.8 lagging	
Max. total harmonic distortion	<3% @Rated output power	
DCI	<0.5%In	<0.5%In
Back-up Side		
Rated output power (kW)	5.0	8.0
Max. output power (kW)	5.5	8.0
Rated output apparent power (kVA)	5.0	8.0
Max. output apparent power (kVA)	5.5	8.0
Rated output current (A)	21.7	36.3
Max. output current (A)	25.0	36.3
UPS switching time	<10ms	<10ms
Rated output voltage (V)	L/N/PE, 220/230/240V	
Rated output frequency (Hz)	50/60	50/60
Peak output apparent power (kVA)	7.8,10s	10.4,10s
Voltage harmonic distortion	<3% @Linear load	
Efficiency		
Max. efficiency	97.6%	97.6%
European efficiency	97.0 %	97.0 %
Protection		
DC reverse polarity protection	Integrated	
Battery input reverse connection protection	Integrated	
Insulation resistance protection	Integrated	
Surge protection	Integrated	

Model	FHM-5K-HY-1P	FHM-8K-HY-1P
Over-temperature protection	Integrated	
Residual current protection	Integrated	
Islanding protection	Integrated (Frequency shift)	
AC over-voltage protection	Integrated	
Overload protection	Integrated	
AC short-circuit protection	Integrated	
General Data		
Over voltage category	II(PV+Battery), III(Mains)	
Dimensions (mm)	534*418*210 (W*H*D)	
Weight (KG)	27	27
Protection degree	IP65	IP65
Standby self-consumption (W)	<15	<15
Topology	Transformerless	
Operating Temperature Range (℃)	-30~60	-30~60
Relative Humidity (%)	0~100	0~100
Operating Altitude (m)	3000	
Cooling	Natural Convection	
Noise Level (dB)	<25	<25
Display	OLED & LED	
Communication	CAN, RS485/LAN (Optional)	

1) VDE-AR-N 4105: 4.6kW
2) VDE-AR-N 4105: 4.6kW, C10/11: 5.0kW
3) VDE-AR-N 4105: 4.6kVA
4) VDE-AR-N 4105: 4.60kVA, C10/11: 5.0kVA
5) VDE-AR-N 4105: 20.0A
6) VDE-AR-N 4105: 21.0A, C10/11: 21.7A

* PV Max. DC Input voltage and MPPT Max. voltage is 550V without battery, or 500V with battery.

The inverter will stop working when voltage between 550V(without battery)/500V(with battery) to 600V. The inverter will cause damage when voltage higher than 600V.
** In some countries and areas, Max. Power of inverter " FHM-5K-HY-1P " can not exceed 5 kW or kVA via setting the "Underload" mode.
***Rated current of built-in Fuse.

8.2 Contact Information

Should you have any question about this product, please contact us.

We need the following information to provide you the best assistance:

- Model of the device
- Serial number of the device
- Date of the device
- Fault code/name
- Brief description of the problem

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