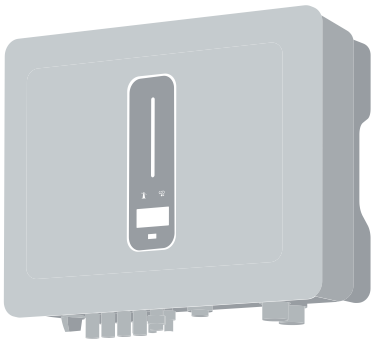
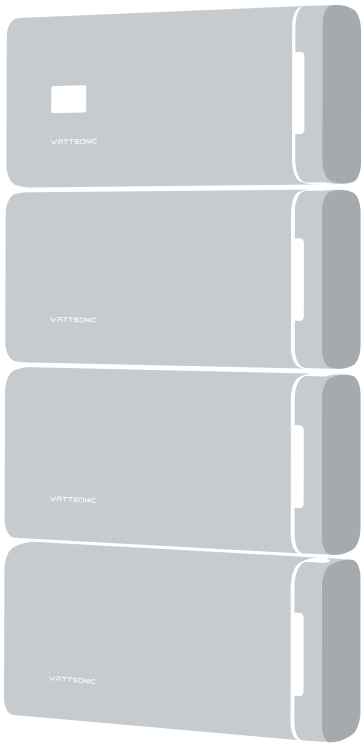




User Manual

Wattsonic Li-HV Residential Three Phase Hybrid

6.0/8.0/10.0 KW-25A-3P | 12.0/15.0/20.0 KW-40A-3P

Sep 2024


WATTSONIC

Power your home,
and you will power the planet.

Contents

Overview

1.1 Overview

Thank you for choosing Wattsonic Li-HV Residential Three Phase Hybrid series. Of course, you have made a great decision, and you will be pleased with the features, benefits, and quality of this product.

Wattsonic Li-HV Residential Three Phase Hybrid series is an intelligent hybrid energy storage system that turns solar panels into an all-day resource while offering backup power during a grid outage. It enables renewable energy storage, allowing optimized home energy control and increasing total electricity production from renewable sources. Reliable renewable energy improves the resiliency of the grid and reduces energy costs.

These instructions will help you to familiarize yourself with the Wattsonic Li-HV Residential Three Phase Hybrid series by reading the instructions, you will be sure to get the maximum benefit from this device.

Power when needed

Th enables energy storage from solar panels during the day or from the grid when energy rates are low, discharges energy for backup or use at night, and automatically optimizes home energy. This Wattsonic All-in-One ESS thereby maximizes solar consumption and reduces energy spending.

A flexible solution

This residential series can be charged from solar or grid power, providing backup power.
If more energy is needed, multiple Wattsonic All-in-One ESSs can be installed together to work as a more extensive system.
This manual is an integral part of Wattsonic 6.0–20.0 kW-3P series three-phase high-voltage hybrid inverters (after this referred to as the inverter). It mainly introduces assembly, installation, electrical connection, debugging, maintenance, and troubleshooting of the products.
The products, services, or features purchased are subject to the commercial contracts and terms of Wuxi Wattsonic Energy Technology Co., Ltd., All or part of the products, services, or features described in this document may not be within the purchase scope. This document serves only as a guide; all statements, information, and recommendations do not constitute any express or implied guarantee.

Errors or omissions

To communicate any inaccuracies or omissions in this manual, please send an email to: service@wattsonic.com

ELECTRONIC DEVICE: DO NOT THROW AWAY

Proper disposal of batteries is required. Refer to your local codes for disposal requirements.
(ie. EC N 1013/2006 among European Union).

Copyright

Before installation

To secure the full 10-year product warranty, be sure to install the Wattsonic Li-LV battery modules by qualified installers.

Warning: Before installing or using the Wattsonic Li-HV Residential Three Phase Hybrid series, read this document. Failure to do so or to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, death, potentially rendering them unusable.

Before installing and using Wattsonic Li-HV Residential Three Phase Hybrid series, please read this manual carefully, understand the safety information, and be familiar with the functions and characteristics of this device.

All specifications and descriptions in this document are verified to be accurate when printed. The manual content of subsequent inverter versions may be subject to change. You can find the newest manual at www.wattsonic.com.

2.1 Qualified personnel

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

a) Training for installation and commissioning of the electrical system, as well as dealing with hazards.

b) Knowledge of the manual and other related documents.

c) Knowledge of the local regulations and directives.

Supported Environment

3.1 Supported environment

3.1.1 Installation location of inverters

1. The wall on which the inverters are mounted must withstand the weight of the inverter.

2. The inverter needs to be installed in a well-ventilated environment.

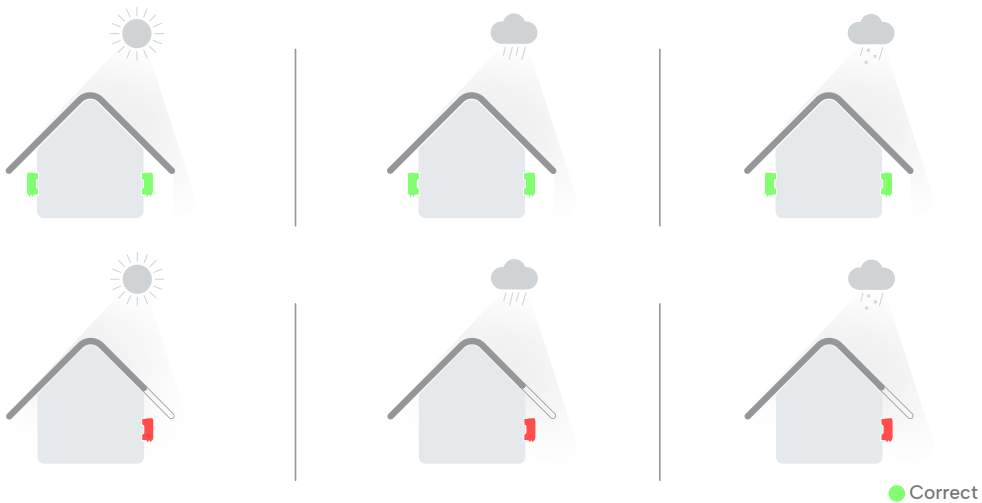
3. Do not expose the inverter directly to strong sunlight to prevent excessive temperature operation. You can install the inverter in a place with shelter to avoid direct exposure to sunlight and rain.

4. Install the inverter at eye level for easy inspection of screen data and further maintenance.

5. Install the inverter at a place convenient for electrical connection, operation, and maintenance.

6. The ambient temperature of the inverter installation location should be between -30°C and 60°C.

7. The surface temperature of the inverter may reach up to 75°C. To avoid the risk of burns, do not touch the inverter while it's operating, and you will need to install the products out of the reach of children.



Recommended installation location

Keep flammable and combustible things away from the inverter

3.1.2 Installation location of batteries

The floor is flat and level.

There are no flammable or explosive materials.

The ambient temperature is within the range of 0°C to 50°C.

The temperature and humidity remain constant.

There is minimal dust and dirt in the area.

The distance from a heat source is more than 2 meters.

The distance from the air outlet to the system is more than 0.5 meters.

Do not cover or wrap the battery case or cabinet.

Do not place it in a children's or pet-touchable area.

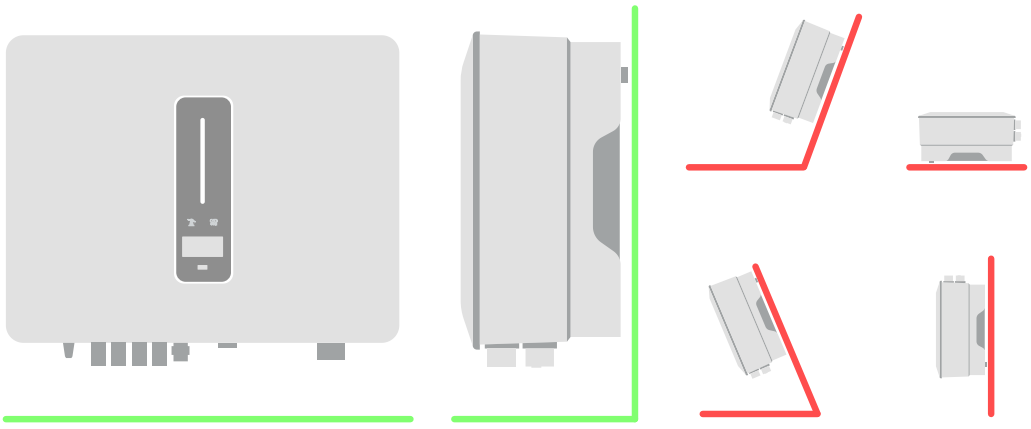
The installation area shall avoid direct sunlight.

There are no mandatory ventilation requirements for the system, but please avoid installation in a confined area (minimum 250mm to the top, 150mm to the bottom, 250mm to the left and each other, and 250mm to the right).

The aeration shall avoid high salinity, humidity, or temperature.

3.1.3 Installation angle

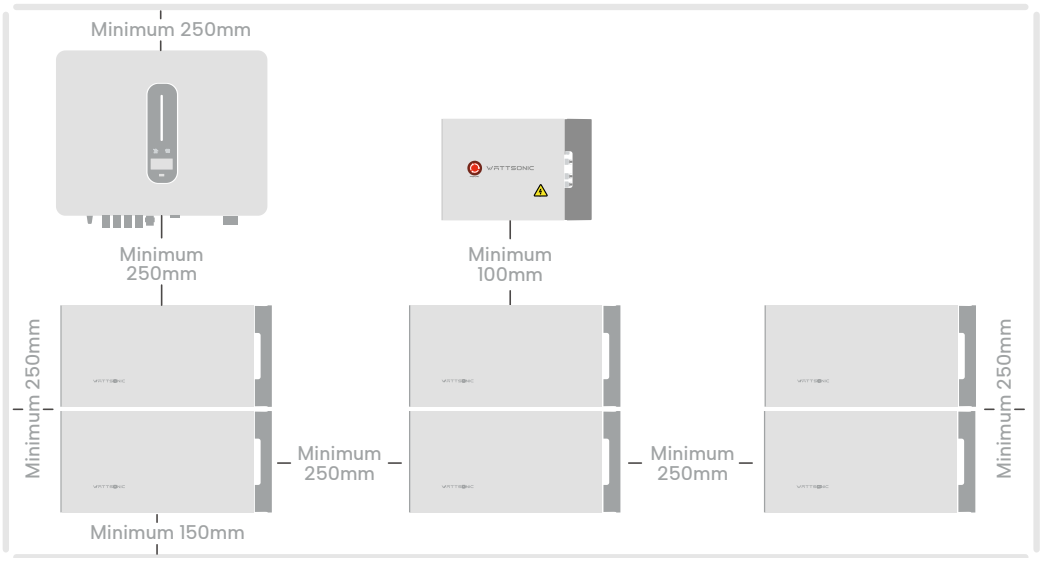
Install the inverter vertically. Never install the inverter horizontally, at a forward or backward tilt, or upside down.



Permitted and prohibited mounting positions

3.1.4 Recommended installation spacing

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



3.2 Disclaimer

Wuxi Wattsonic Energy Technology Co., Ltd. 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 the installation and use of equipment by non-professionals or untrained personnel

4) Damages caused by failure to comply with this document's instructions and safety warnings

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 an abnormal natural environment (force majeure, such as lightning, earthquake, fire, storm, etc.)

9) Any damages caused by the process of installation and operation that don't follow the local standards and regulations

10) Products beyond the warranty period

Safety Instruction and Warning

PLEASE SAVE THESE ESSENTIAL SAFETY GUIDELINES.

Wattsonic All-in-One ESS, installation, and repair instructions assume knowledge of high-voltage electricity. Wattsonic Certified installers should only perform them. Wattsonic assumes no liability for injury or property damage due to repairs attempted by unqualified individuals or a failure to follow these instructions properly. When utilizing Wattsonic ESS, you have to follow these warnings and precautions.

Symbols on the packing box


Handle with care.


This side up.


Keep dry.

Stacked layers.

Symbols on the hybrid inverter


Power indicator.care.


Grid status indicator.


Inverter status indicator.


Battery SOC indicator.


Grounding symbol: The inverter casing needs to be properly grounded.

Symbols on the Inverter nameplate

	The inverter cannot be disposed of with household waste.
	Please read the instructions carefully before installation.
	Do not touch any internal parts of the inverter until 5 min after being disconnected from the mains and PV input.
	CE mark, the inverter complies with the requirements of the applicable CE guidelines.
	TüV certification.
	Danger. Risk of electric shock!
	The surface is hot during operation and no touch is allowed.
	Electric shock hazard: Using a person to disassemble the inverter casing is strictly forbidden.

Safety Notes

1. Before installation, please read this manual carefully and follow the instructions in this manual strictly.

2. Installers must undergo professional training or obtain electrical-related professional qualification certificates.

3. Do not open the front cover of the inverter when installing. 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, don't hesitate to contact the local designated personnel for 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 the process. 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 endanger your 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.

Symbols in this document

This manual uses the following symbols to highlight important information:

DANGER	Danger signs warn of urgent, dangerous situations. If not avoided, it could result in death or serious personal injury.
WARNING	Warning indicates a hazardous situation that, if not avoided, could result in injury or death.
CAUTION	Caution indicates a hazardous situation that, if not avoided, could damage the equipment.
ATTENTION	Attention transmits safety warning information about equipment or the environment, data loss, or other unpredictable results. It does not relate to physical injury.
NOTE	Note indicates a vital step or tip that leads to the best results but is not safety or damage-related.

1. Read this entire document before installing or using Wattsonic All-in-one ESS. Failure to do so or to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, or death or can damage the Wattsonic LFP Battery, potentially rendering it inoperable.

2. A battery can present a risk of electrical shock, fire, or explosion from vented gases. Observe proper precautions.

3. Wattsonic All-in-one storage system installation must be carried out only by Wattsonic Certified Installers, trained in dealing with high voltage electricity.

4. Wattsonic is heavy and challenging to lift.

5. Use the Wattsonic LFP Battery only as directed.

6. Do not use a Wattsonic LFP Battery if it is defective, appears cracked, broken, or otherwise damaged, or fails to operate.

7. Before beginning the wiring portion of the installation, power off the inverter and then open the AC and DC disconnect switches (if applicable).

8. Do not attempt to open, disassemble, repair, tamper with, or modify Wattsonic LFP Battery. Wattsonic LFP Battery is not user serviceable. LFP Cells in Wattsonic Battery are not replaceable. Contact the Wattsonic Authorized Reseller who sold the Wattsonic LFP Battery for any repairs.

9. Do not connect Wattsonic LFP Battery to alternating current carrying conductors. Wattsonic All-in-one storage system including battery and inverter must be wired to either an inverter or a DC combiner panel that is then wired to an inverter. No other wiring configuration may be used.

10. Wattsonic LFP Battery contains components, such as switches and relays, that can produce arcs or sparks.

11. Handle with care to protect the Wattsonic LFP Battery and its components from damage when transporting. Do not impact, pull, drag, or step on Wattsonic LFP Battery. Do not subject Wattsonic LFP Battery to any muscular force. To help prevent damage, leave Wattsonic LFP Battery in its shipping packaging until it is ready to be installed.

12. Do not insert foreign objects into any part of Wattsonic LFP Battery.

13. Do not expose Wattsonic LFP Battery or its components to direct flame.

14. Do not install Wattsonic LFP Battery near heating equipment.

15. Do not immerse Wattsonic LFP Battery or its components in water or other fluids.

1. Do not use cleaning solvents to clean Wattsonic LFP Battery or expose Wattsonic LFP Battery to flammable or harsh chemicals or vapors.

2. Do not use fluids, parts, or accessories other than those specified in this manual, including non-genuine Wattsonic parts or accessories or parts or accessories not purchased directly from Wattsonic or a Wattsonic-certified party.

3. Do not place Wattsonic LFP Battery in a storage condition for more than one (1) month or permit the electrical feed on the Wattsonic LFP Battery to be severed for more than one (1) month without placing Wattsonic LFP Battery into a storage condition under Wattsonic's storage specifications.

4. Do not paint any part of Wattsonic LFP Battery, including any internal or external components such as the exterior shell or casing.

5. Do not directly connect the Wattsonic LFP Battery to photovoltaic (PV) solar wiring.

6. When installing a Wattsonic LFP Battery in a garage or near vehicles, keep it out of the driving path. Install the Wattsonic LFP Battery on a side wall and/or above the height of vehicle bumpers.

Environmental conditions

1. Install Wattsonic LFP Battery at a height that prevents damage from flooding.

2. Operating or storing Wattsonic LFP Battery in temperatures outside its specified range might cause damage to Wattsonic LFP Battery.

3. Do not expose the Wattsonic LFP Battery to ambient temperatures above 60°C (140°F) or below -30°C (-22°F).

Ensure no water sources are above or near Wattsonic LFP Battery, including downspouts, sprinklers, or faucets.

Electrical connection

1. A high voltage in the conductive part of the inverter may cause an electric shock. When installing the inverter, ensure the AC and DC sides are completely de-energized.

2. Do not attach the N-wire to the inverter casing as a protective ground wire. Otherwise, it could result in an electric shock.

1. Do not ground the positive or negative pole of the PV string. Otherwise, it will cause severe damage to the inverter.

2. Static may cause damage to the electronic components of the inverter. It would help if you took anti-static measures during installation and maintenance.

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

1. Do not use other brands and types of terminals other than those included in the accessory package. Wattsonic has the right to refuse all damages caused by the mixed-use of terminals.

2. Moisture and dust can damage the inverter. Ensure the cable gland is securely tightened during installation. You will invalidate the warranty claim if the inverter is damaged due to a poorly connected cable connector.

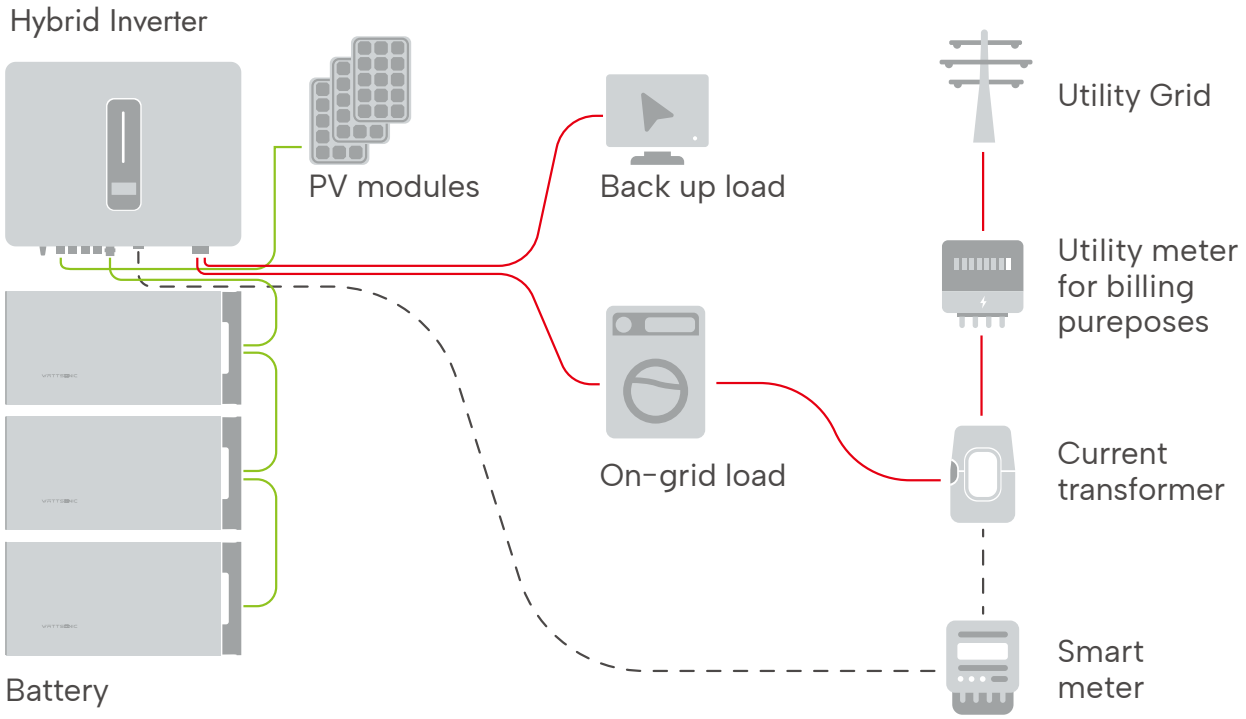
3. For a system with only one inverter, just ground the PE cable.

All inverters' PE wires should connect to the same grounding copper bar for a multi-inverter system to ensure equipotential bonding.

Description

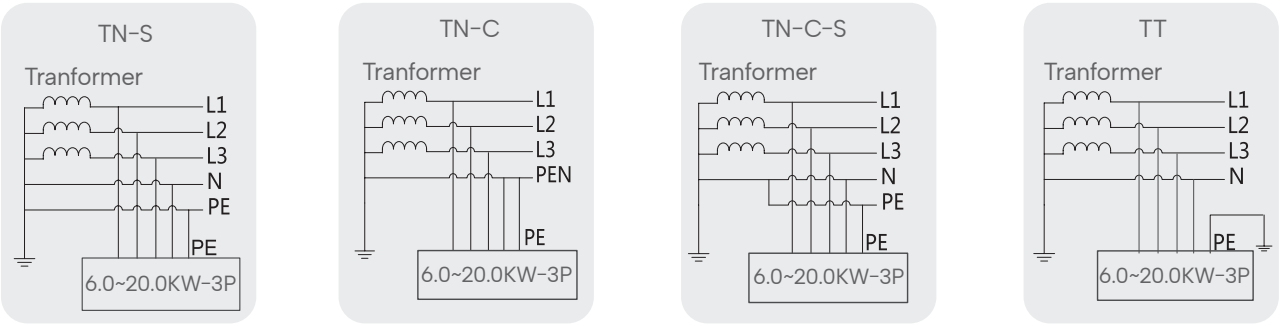
5.1 System introduction

The hybrid solar system usually comprises the PV array, hybrid inverter, lithium battery, loads, and power grid.



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 Wattsonic 6.0-20.0kW-3P series 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.



5.2 Product introduction

The Wattsonic 6.0-20.0kW-3P series inverter is also known as a hybrid inverter or storage inverter, which is mainly used to combine the PV array, lithium battery, loads, and power grid to realize intelligent power management and dispatching.

5.2.1 Models

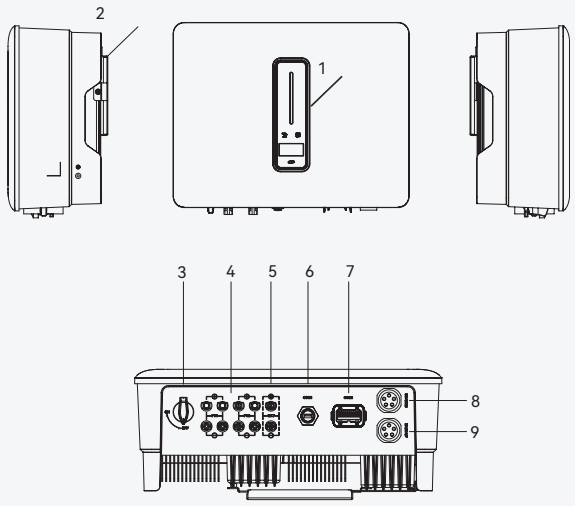
1. The Wattsonic 6.0-20.0kW-3P series hybrid inverter includes 6 models, which are listed below: 6.0K-25A-3P, 8.0K-25A-3P, 10K-25A-3P, 12K-40A-3P, 15K-40.0A-3P, 20K-40A-3P.

2. The Wattsonic Li-HV BMS includes 1 models, which are BMS-3.84.

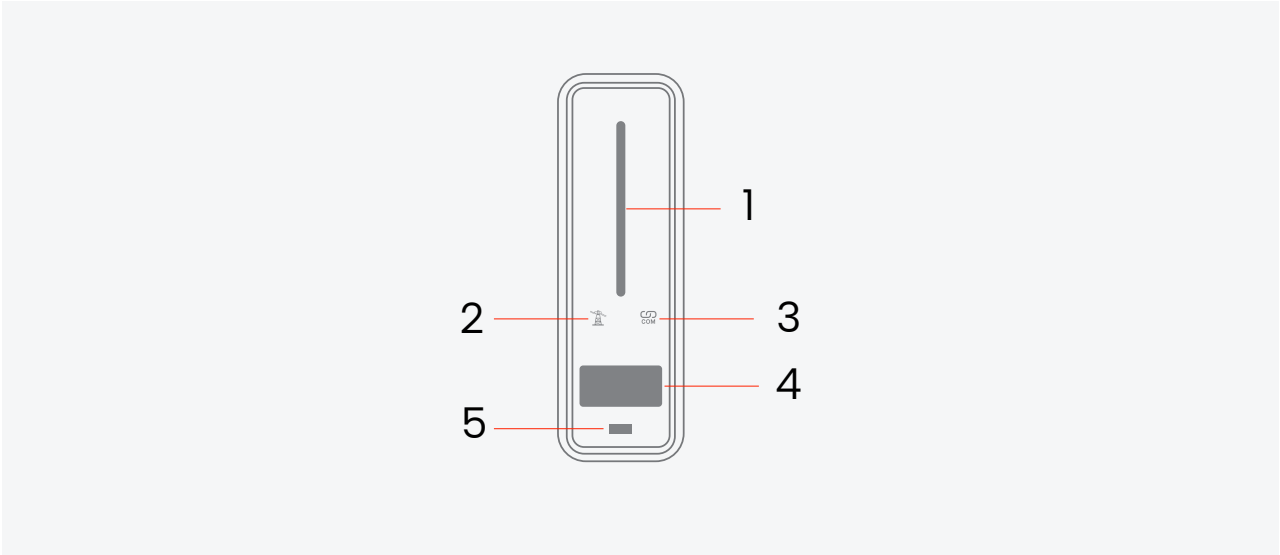
3. The Wattsonic Li-HV battery module includes 1 models, which are WTS-R24-3.84kWh.

Detailed datasheet, pleace refer to chapter 12: Appendix.

5.2.2 Inverter appearance



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	WiFi/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



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 Wattsonic 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.		

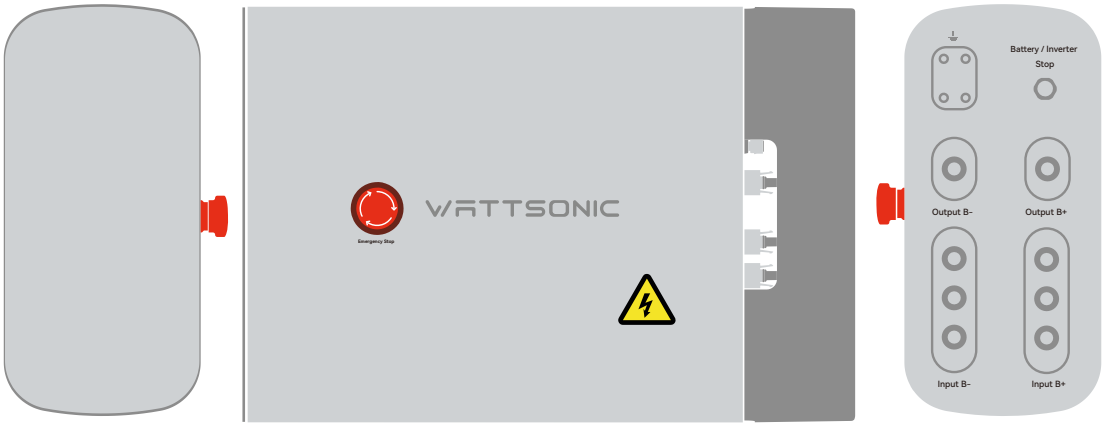
5.2.3 BMS appearance(GEN 3.0)

BMS with lighting

BMS with LED screen

5.2.4 Battery appearance(GEN 3.0)

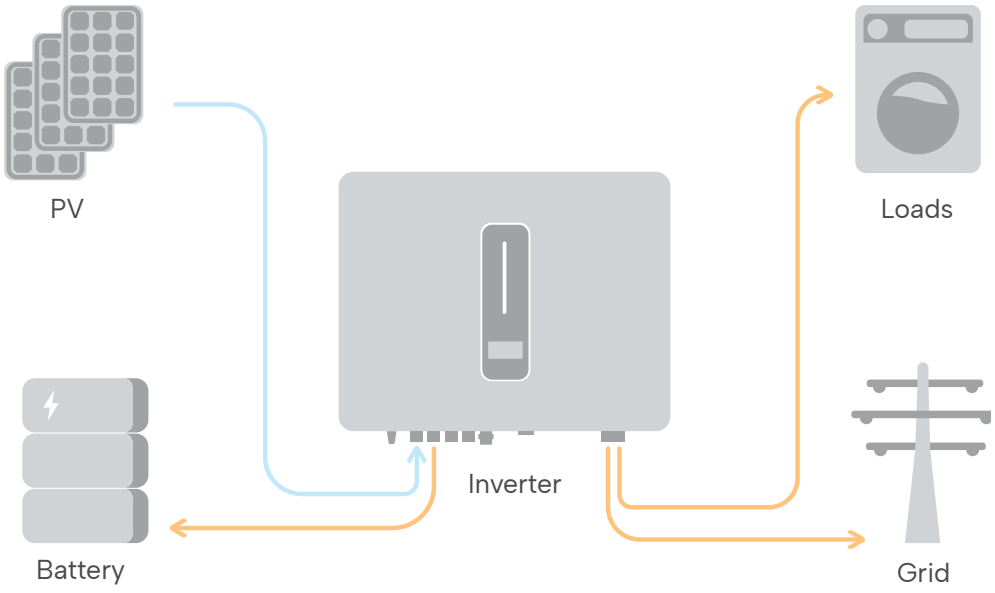
5.2.5 Combiner Box appearance



5.3 Operation modes

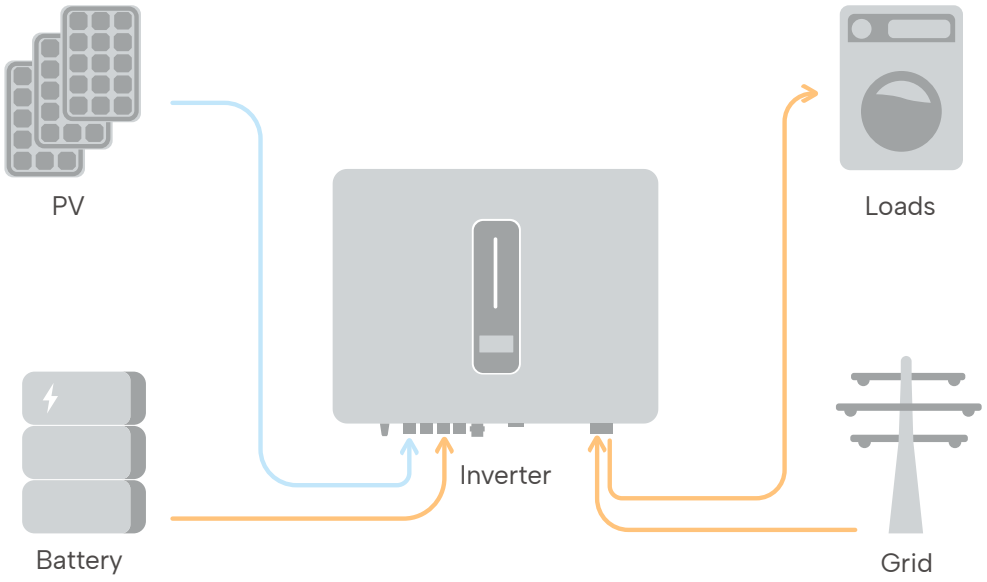
Wattsonic 6.0-20.0kW-3P series inverter has the following basic operation modes and you can configure the operation mode as per your preference in the App.

General Mode



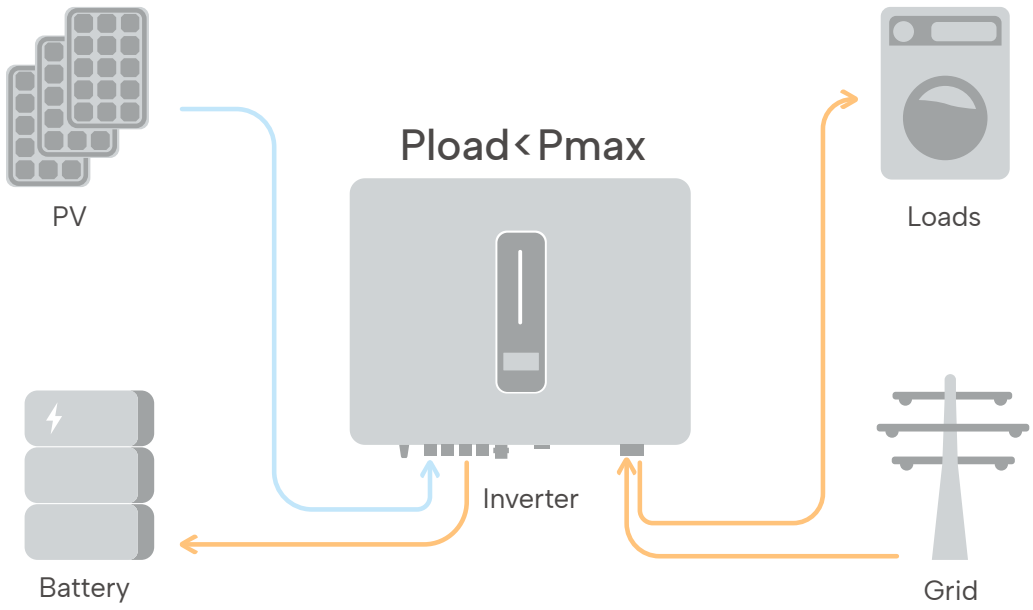
In this working mode, when the power from the PV array is sufficient, PV power will supply the loads, battery, and grid in the order of loads first, battery second, and grid last.

(You can set the power to the grid to 0W when the local grid doesn't allow inverter power to feed to the grid).



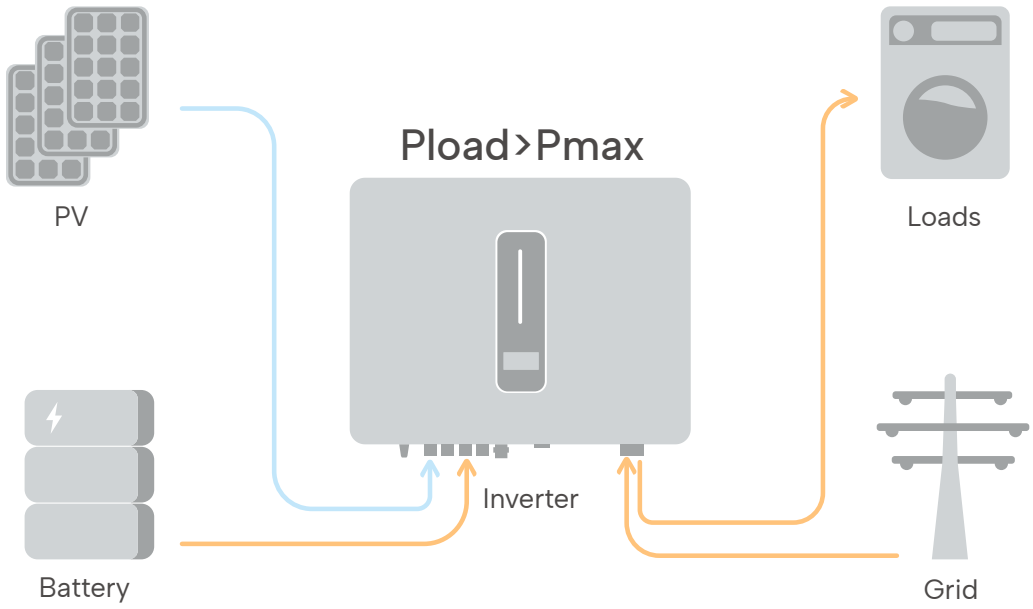
When the PV power is insufficient, the battery will discharge to supply loads, and the grid will join in if the battery is not enough to supply loads.

Peak load Shifting (Load Shifting)



Set the maximum power Pmax (kVA) contracted with the grid.

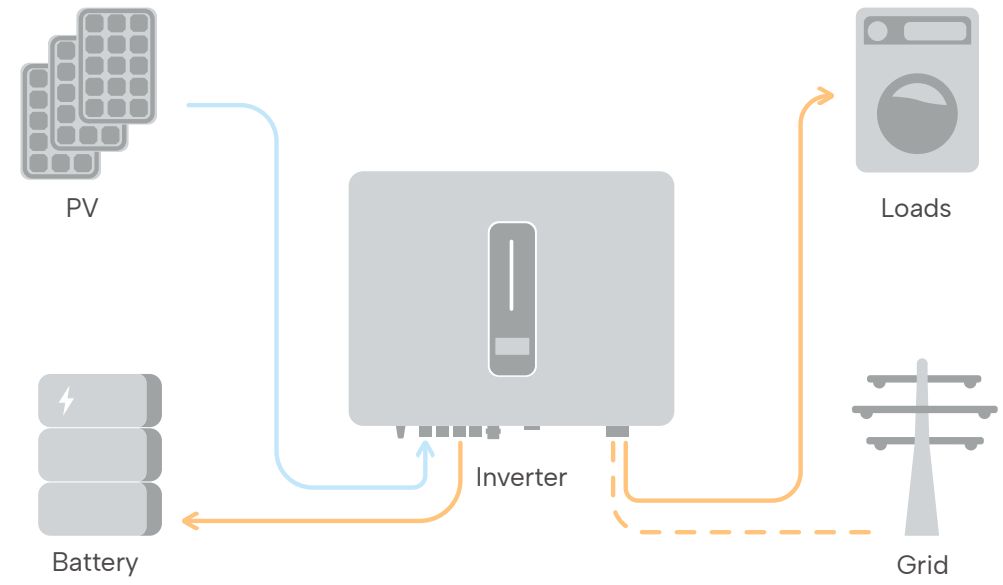
When the load consumption is less than the Pmax, the PV will charge the battery first, and the grid will supply the load. Once the battery is complete, the PV will power the load and the grid rather than the battery.



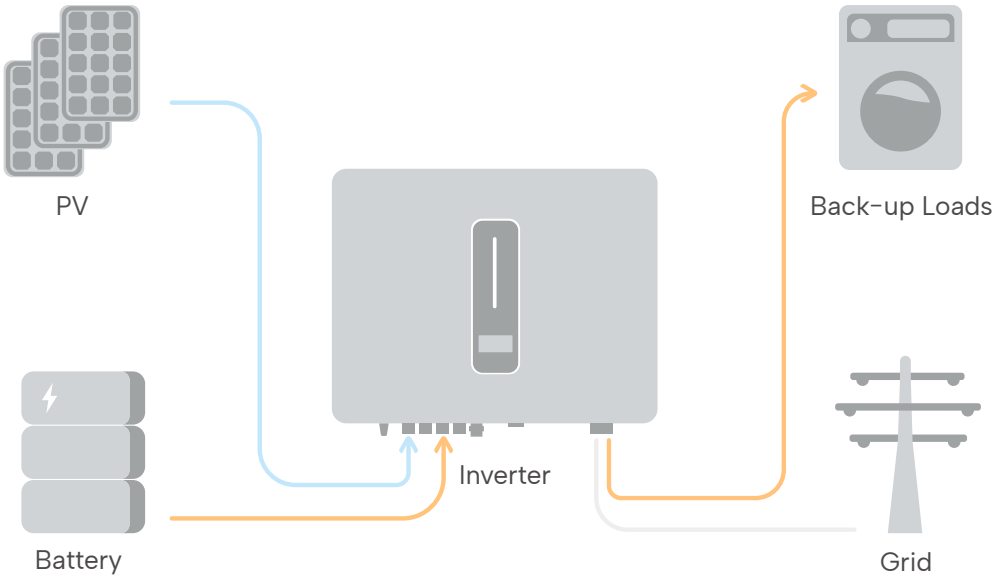
When the load consumption exceeds the Pmax, the inverter will take power from the battery and PV to supply power to the load to compensate for the power that exceeds the Pmax.

*To realize the "Peak load Shifting" function, the load power that exceeds Pmax has to be within the inverter max output power. Otherwise, the inverter will only output the maximum power allowed.

UPS Mode

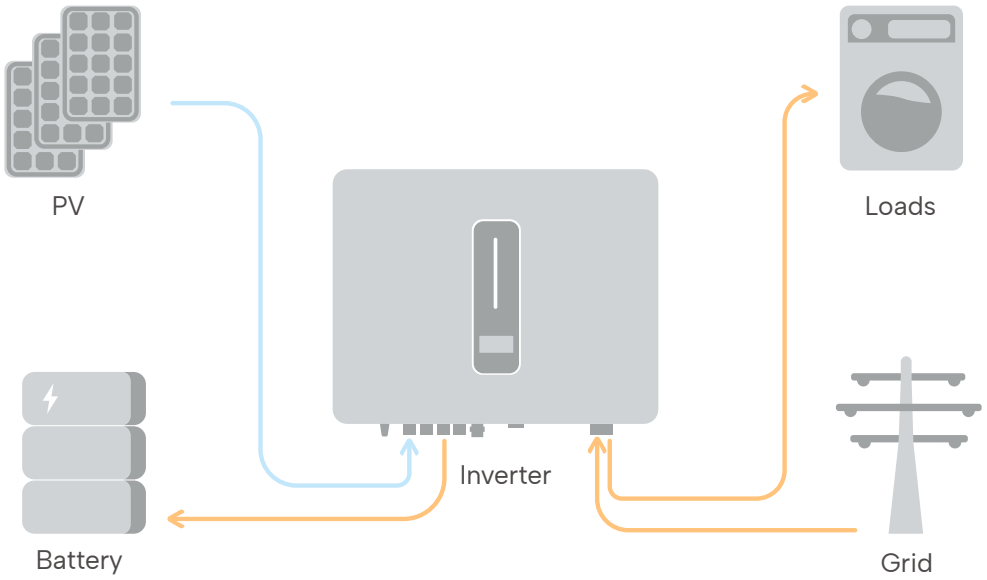


In this working mode, the inverter will use the power from PV or grid to charge the battery until it is fully charged, and as long as the grid is there, the battery won't discharge.

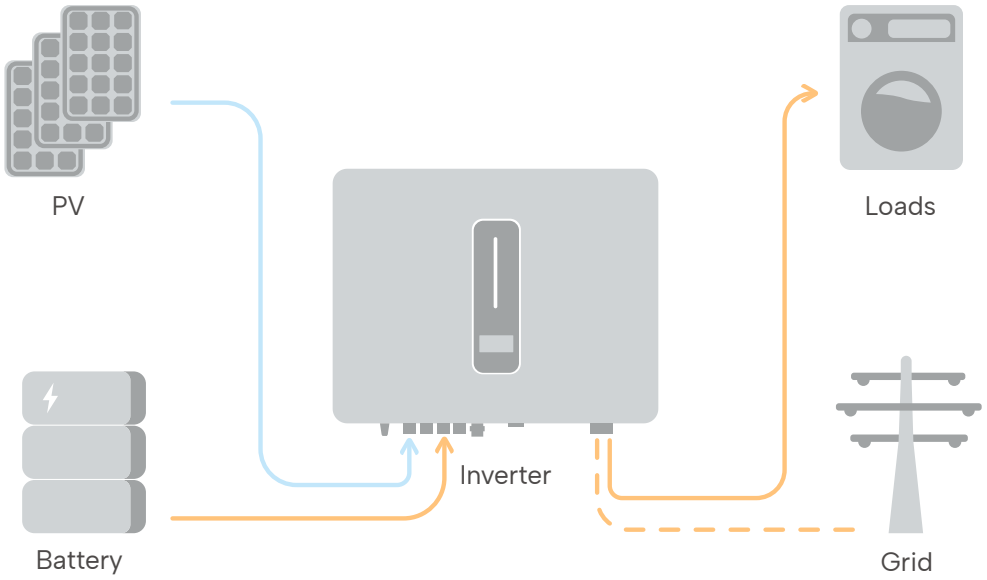


When the grid fails, power from the PV and battery will supply loads connected to the backup side (UPS).

Economic Mode

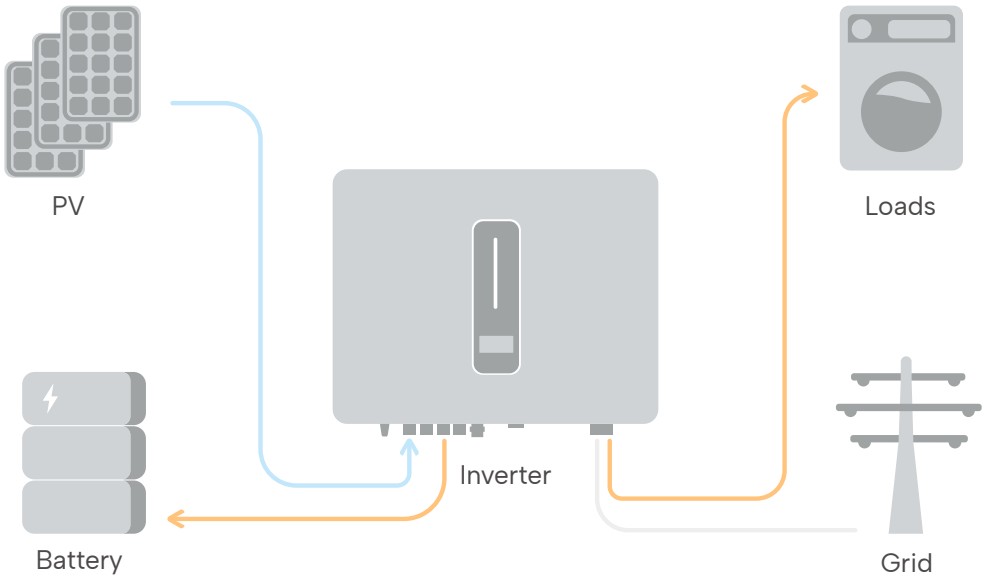


In this working mode, you can set charge/discharge power and time in the App. The inverter will use the energy from PV or the grid (whether to use it or not can be set in the App) to charge the battery for a predetermined period.

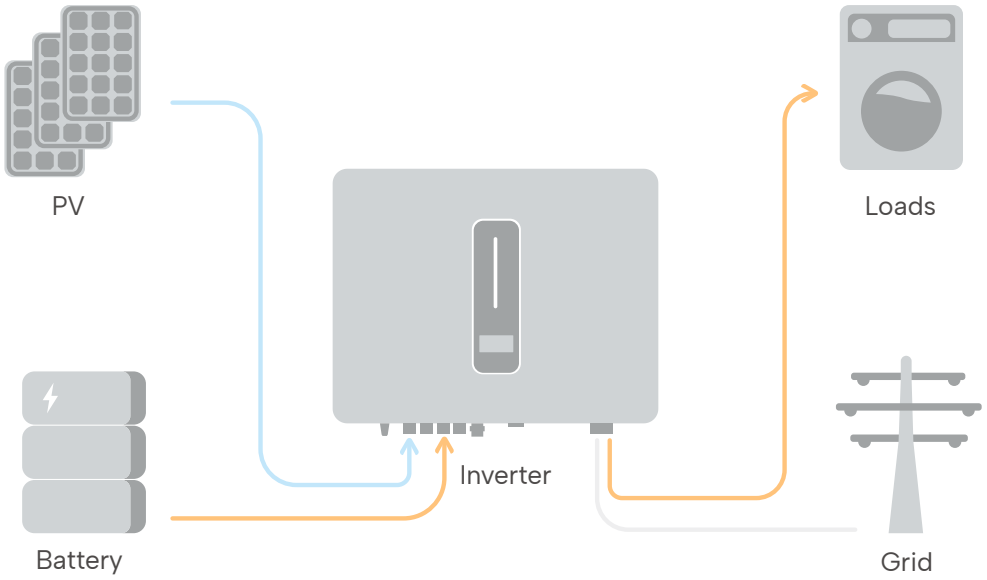


The inverter will use power from PV and batteries to supply loads for the predetermined period, and the grid will deliver the insufficient part.

Off-Grid Mode



In the purely off-grid mode, power fromPV will supply the back-up loads first andthen charge the battery if there's surpluspower.



When the power from PV isn't enough, the battery will discharge to supply backup loads with PV.

5.4 Back-up and off-grid output

Typically, the Backup switching time is less than 10 ms. However, some external factors may cause the system to fail when switching to Backup mode. Therefore, the conditions for using the Backup function smoothly are as follows:

Do not connect loads dependent on a stable energy supply for reliable operation.

Do not connect loads with a total capacity more incredible than the maximum Backup capacity.

Do not connect the loads that may cause very high start-up current surges, such as non-frequency conversion air conditioning, vacuum cleaners, or half-wave loads such as a hair dryer, heat gun, or hammer drill.

Due to the condition of the battery itself, battery current might be limited by some factors, including but not limited to temperature and weather.

Wattsonic's 6.0-20.0 kW-3P hybrid inverter overloading ability in off-grid work mode described as follows:

Off-grid Overloading Ability Illustration

Status	Mode	Phase 1	Phase 2	Phase 3	Duration
Off-grid	Balance Output Mode	1.1 times	1.1 times	1.1 times	Continuous
		2 times	2 times	2 times	60 s
	Unbalance Output Mode	1.25 times*	1.25 times*	1.25 times*	Continuous

The multiples above are calculated based on rated output power.
6.0-20.0 kW instantaneous max output power is 25 kW.
*Only one of the three phases can reach up to 1.25 times, and the other two phases should be less than 1.1 times.

The inverter will restart in the event of overload protection. If overload protection repeats, the time required for restarting will increase (5 minutes at most). Try reducing backup load power within the maximum limitation or removing loads that may cause very high start-up current surges.

5.5 Unpacking and 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 between -30°C and 60°C 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.

4) 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.

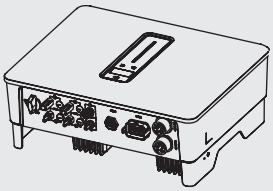
5) Contact Wattsonic or the transport company in case of any damage or incompleteness, and provide photos to facilitate services.

Product Mechanical Installation

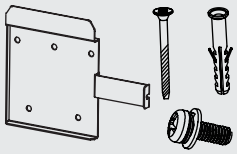
6.1 Packing list

The package of the whole system includes the following accessories. Please check whether the accessories in the packing box are complete when receiving the goods. Some accesssories are optional, need to comfirm upon order.

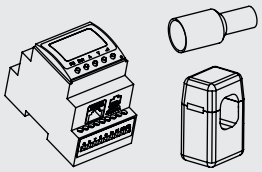
Inverter list



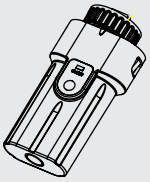
Inverter



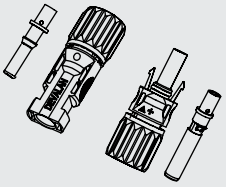
Wall-mounting bracket ,
Expansion plug set,
M5 screws



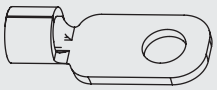
Meter with 3 CTs



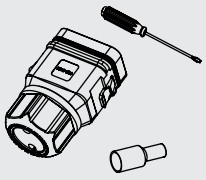
Monitoring device



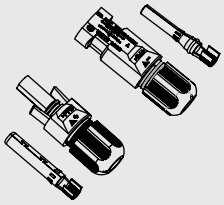
Battery terminal -Blue



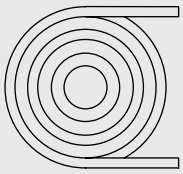
Earth cable terminal



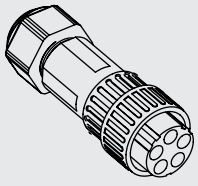
COM2 connector set



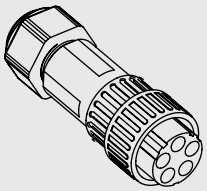
PV terminal
(6.0K-25A-3P / 12K-40A-3P)
-Black



10M meter
communication cable ,
3M battery
communication cable

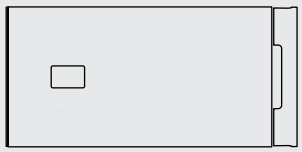


On-grid connector set
-Red



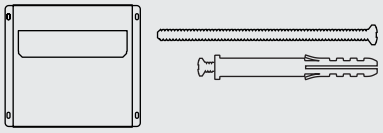
Back-up connector set
-Black

General list



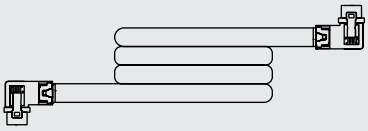
Master BMS Module

Battery Module

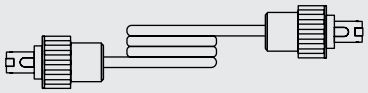


Back-Sheet

Plastic Expansion Pipe and Self-tapping Screw(M4/M6)

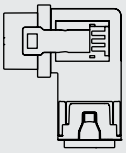


AIO KIT
(Power+COM.+Earthing)
Battery<->Battery
BMS<->Battery

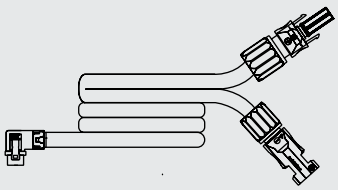


COM Cable
BMS<->Inverter
Battery<->Battery

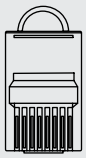
Earth cable



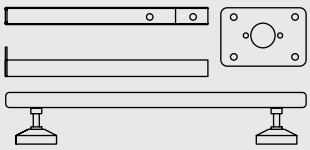
AIO KIT Terminal



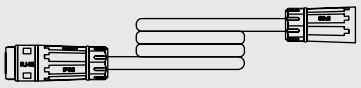
Power Cable
BMS<->Inverter



COM Resistor

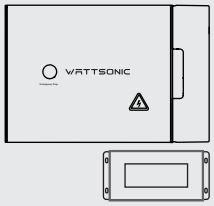


Stack Base(Optional)
Stackable Fixed Bar&
Frame(Optional)

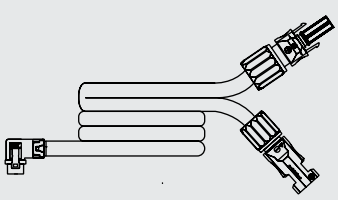


Parallel COM Cable
(Optional)
BMS<->Inverter

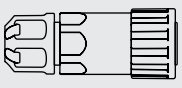
Combiner Box list(Optional)



Combiner Box
Back-Sheet



Power Cable
Combiner Box <->Inverter

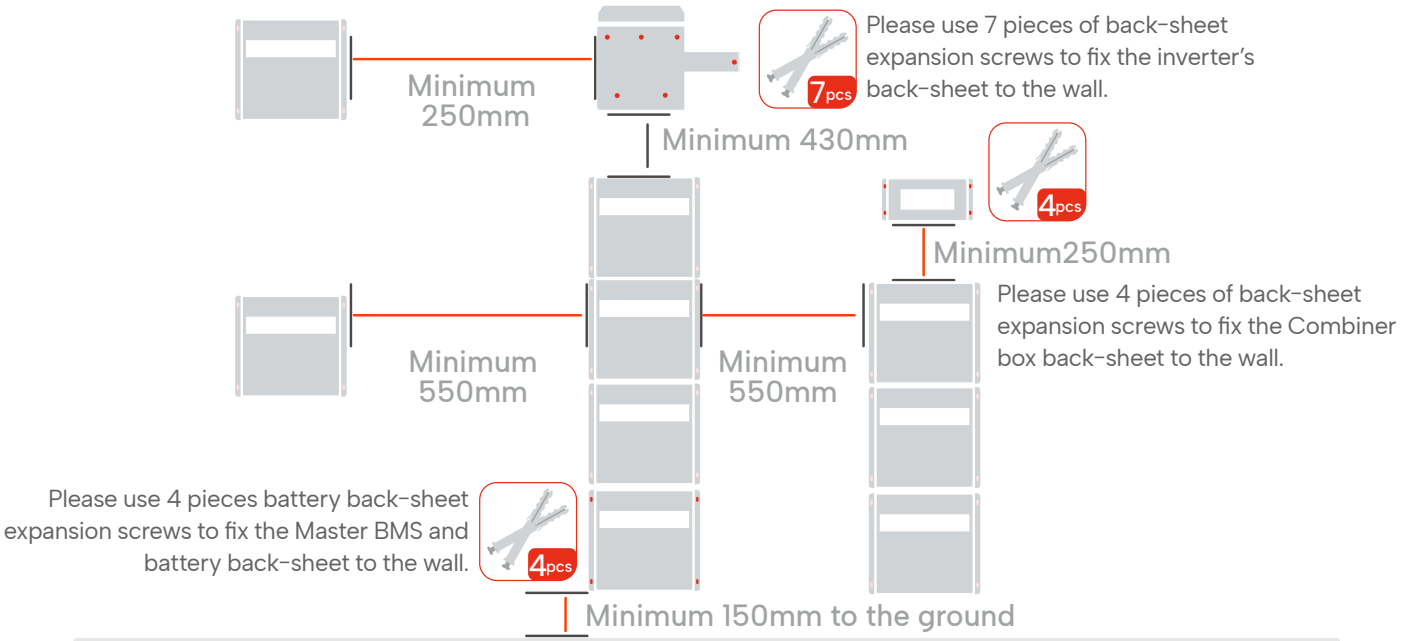


Communication terminal

6.2 Mounting products

6.2.1 Wall mounted (vertical)

Suggested Inverter+Master BMS + Battery Modules

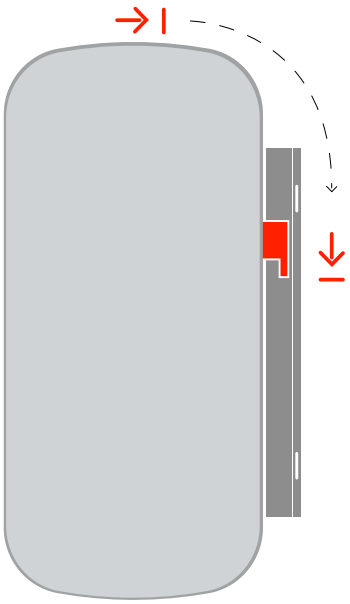


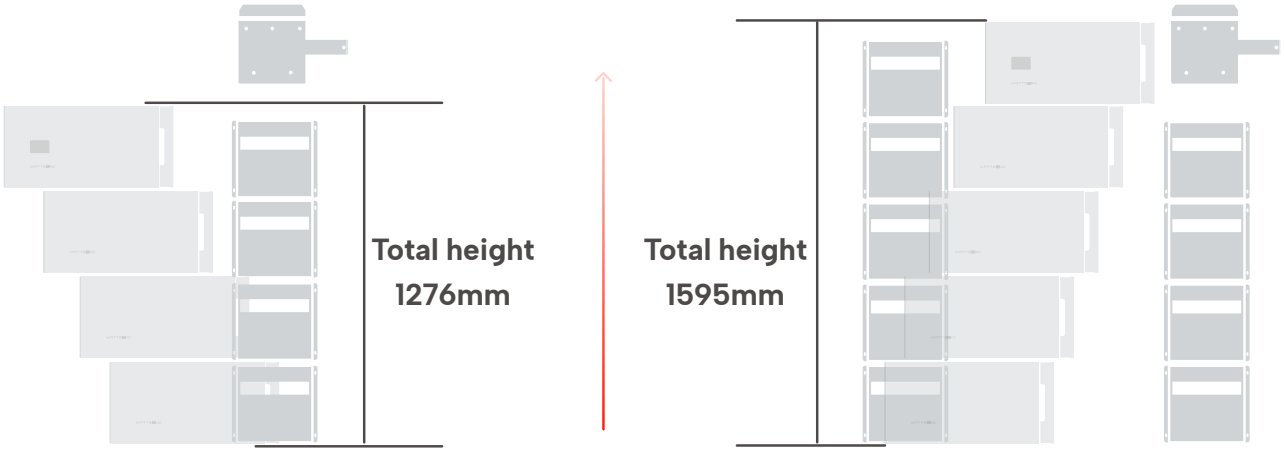
1. Use the back-sheet as a template to mark the position of holes on the wall. Make sure the back-sheet is in a horizontal position.
2. Use an electrical driller to drill holes in the wall and ensure the hole depth is enough.
3. Insert the expansion tubes into the holes and tighten them, then fix the bracket onto the wall with expansion screws using a cross screwdriver.

Avoid the wall's buried water tube and electric wires before drilling.

Mounting the Master BMS and battery modules

Lift the Master BMS or battery modules with both hands and carefully hang the back rail on the back-sheet.



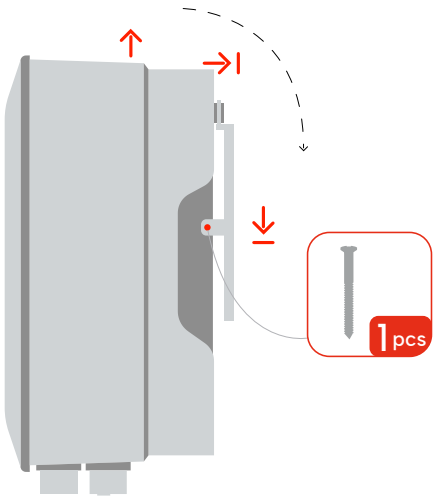


One row of back-sheet

Two rows of back-sheet

Mounting the inverter

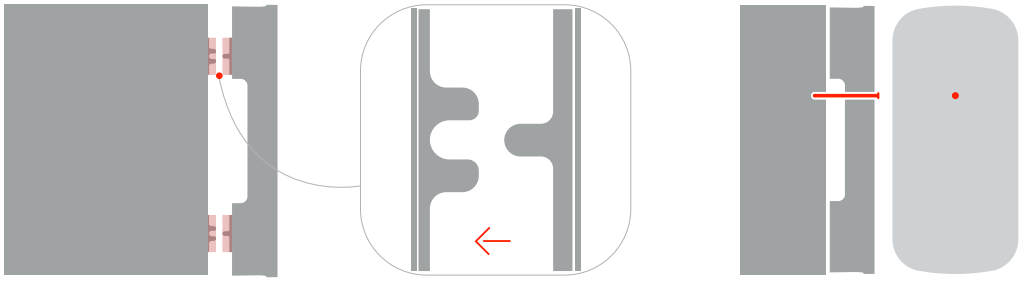
Lift up the inverter with both hands, hang the back rail on the back-sheet carefully.



Fix the inverter to the back sheet with a screw.

Cables connection

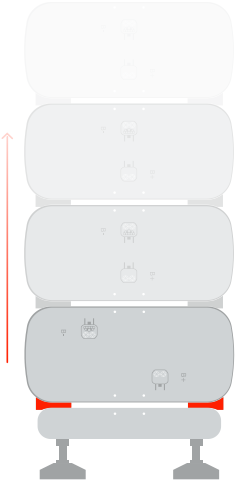
Please refer to chapter 7 for cables connection guide.



After all the cables are connected, push into the cable cover from the right side. Finally, fix the cable cover to the devices with a screw.

6.2.2 Battery stack mounted

Suggested Inverter+Master BMS + Battery Modules



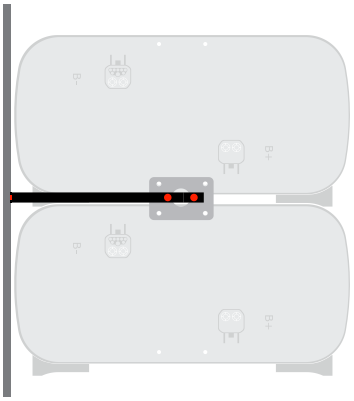
Place the stack base, stacked batteries and Master BMS

Check the installation environment to ensure the ground is level.

Place the stack base on the ground, and ensure it is level and stable. Then, place the first battery on it with the cushion facing down, the remaining batteries and master control in sequence. The external grounding terminal is on the inverter's lower right side.

Mounting the stackable fixed frame

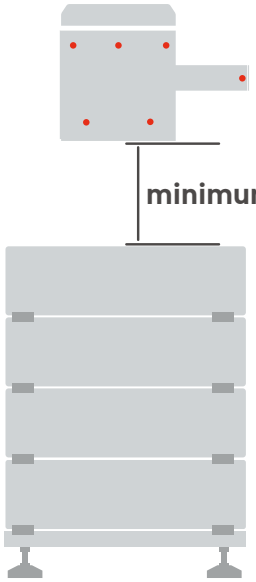
Install two stackable fixed bars between the battery modules, and one on the left side between the battery and Master BMS. Then secure it with screws to ensure the stability of the stack structure.



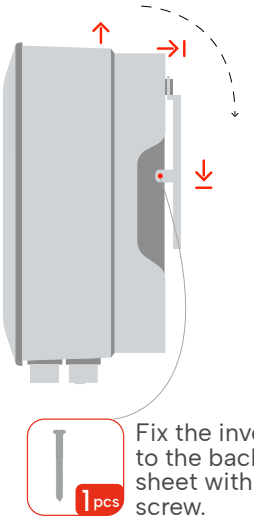
Mounting the stackable fixed bar

After the battery stack is secured, install the stackable fixed bar. Install in the top two stability brackets on the left side of the battery and the Master BMS, and ensure stability.

Mounting the inverter



Please use 7 pieces inverter back sheet expansion screws to fix the inverter back sheet to the wall.



Fix the inverter to the back sheet with a screw.

1) Use the back-sheet as the template to mark the position of holes on the wall. Make sure the back-sheet is in a horizontal position.

2) Use an electric drill to drill holes in the wall and ensure the hole depth is sufficient.

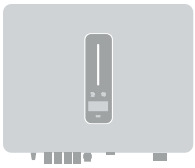
3) Insert the expansion tubes into the holes and tighten them, then fix the bracket onto the wall with expansion screws using a cross screwdriver.

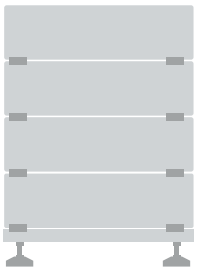
4) Lift the inverter with both hands and carefully hang the back rail on the back-sheet.

Mounting the cable cover

After all the cables are connected (Please refer to chapter 7 for cables connection guide), push into the cable cover from the right side.

Product size





	BMS+BAT*3	BMS+BAT*4	BMS+BAT*5	BMS+BAT*6	BMS+BAT*7	BMS+BAT*8
Total height	610.4mm	763mm	915.6mm	1068.2mm	1373.4mm	1692.4mm
Stack base H: 100mm						

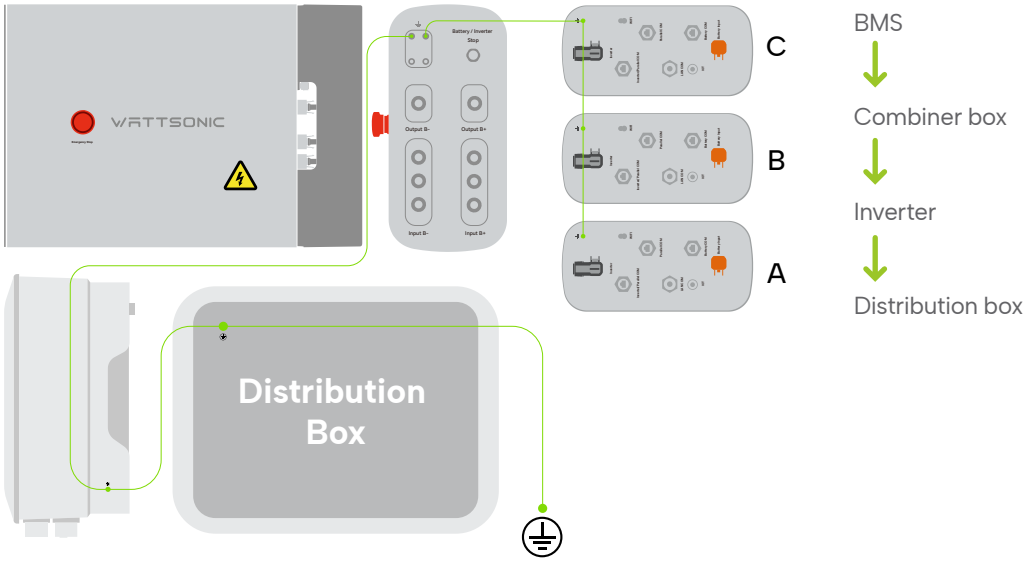
Electrical Connection

7.1 Earth cables connection

Please use standard earth connection cables(M4/2N.M.) to series connect Master BMS and inverter external ground port, then to the earth point in a distribution box. to achieve the purpose of grounding protection. Please always remember to wire the earth cables before wiring other cables.

Single-string system

Multi-string system



1. A high voltage in the conductive part of the inverter may cause an electric shock. When installing the inverter, ensure the AC and DC sides are completely de-energized.

2. Do not attach the N-wire to the inverter casing as a protective ground wire. Otherwise, it could result in an electric shock.

1. Do not ground the positive or negative pole of the PV string. Otherwise, it will cause severe damage to the inverter.

2. Static may cause damage to the electronic components of the inverter. It would help if you took anti-static measures during installation and maintenance.

1. Do not use other brands and types of terminals other than those included in the accessory package. Wattsonic has the right to refuse all damages caused by the mixed-use of terminals.

2. Moisture and dust can damage the inverter. Ensure the cable gland is securely tightened during installation. You will invalidate the warranty claim if the inverter is damaged due to a poorly connected cable connector.

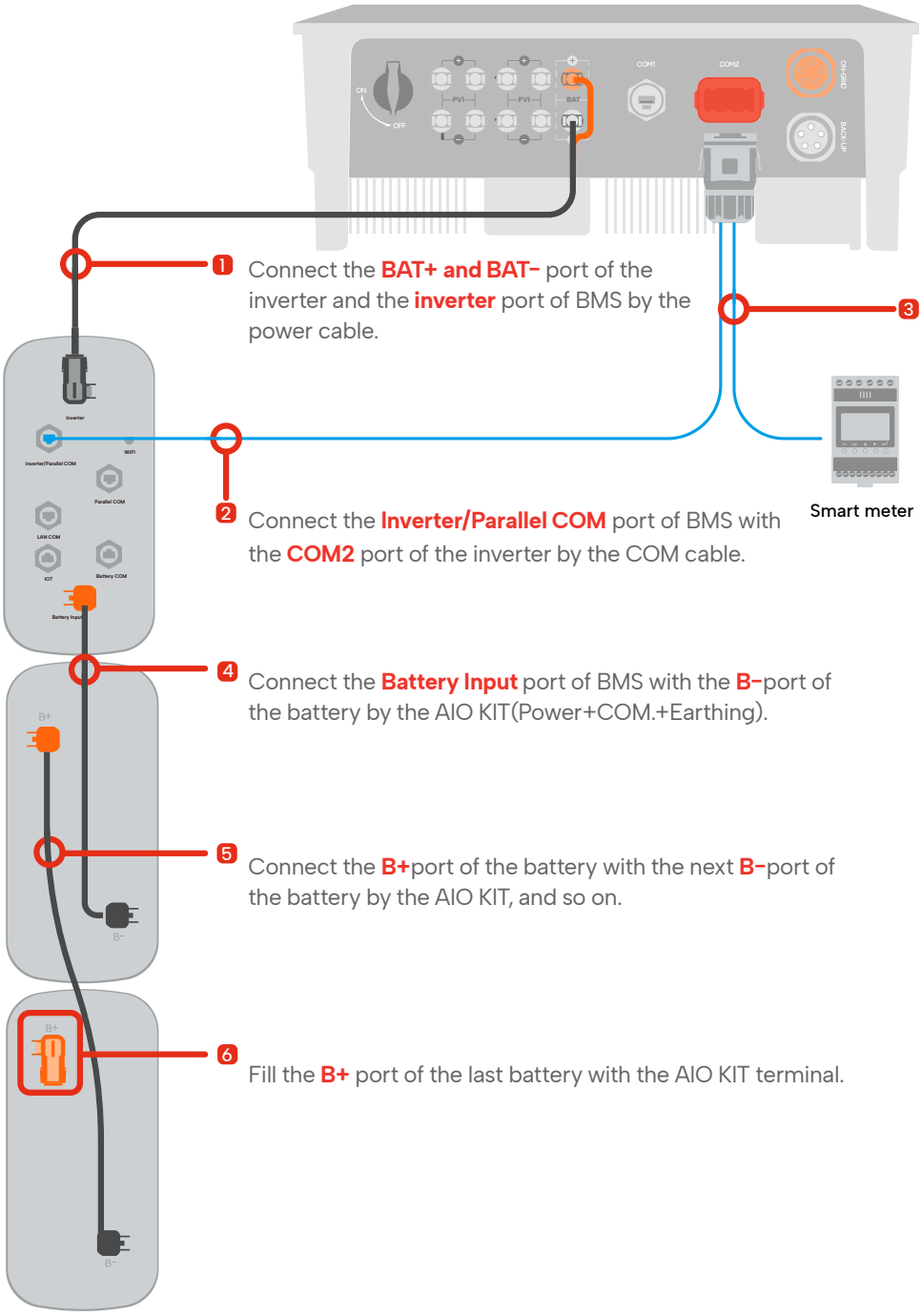
3. For a system with only one inverter, just ground the PE cable.

All inverters' PE wires should connect to the same grounding copper bar for a multi-inverter system to ensure equipotential bonding.

7.2 Battery cables connection

7.2.1 Wall mounting (vertical) of single-string system

Please ensure the main switch of the inverter& BMS is OFF during installation to guarantee high voltage protection.



1 Connect the **BAT+ and BAT-** port of the inverter and the **inverter** port of BMS by the power cable.

2 Connect the **Inverter/Parallel COM** port of BMS with the **COM2** port of the inverter by the COM cable.

3 Connect the **COM2** port of the inverter to the Smart meter with the COM.cable.

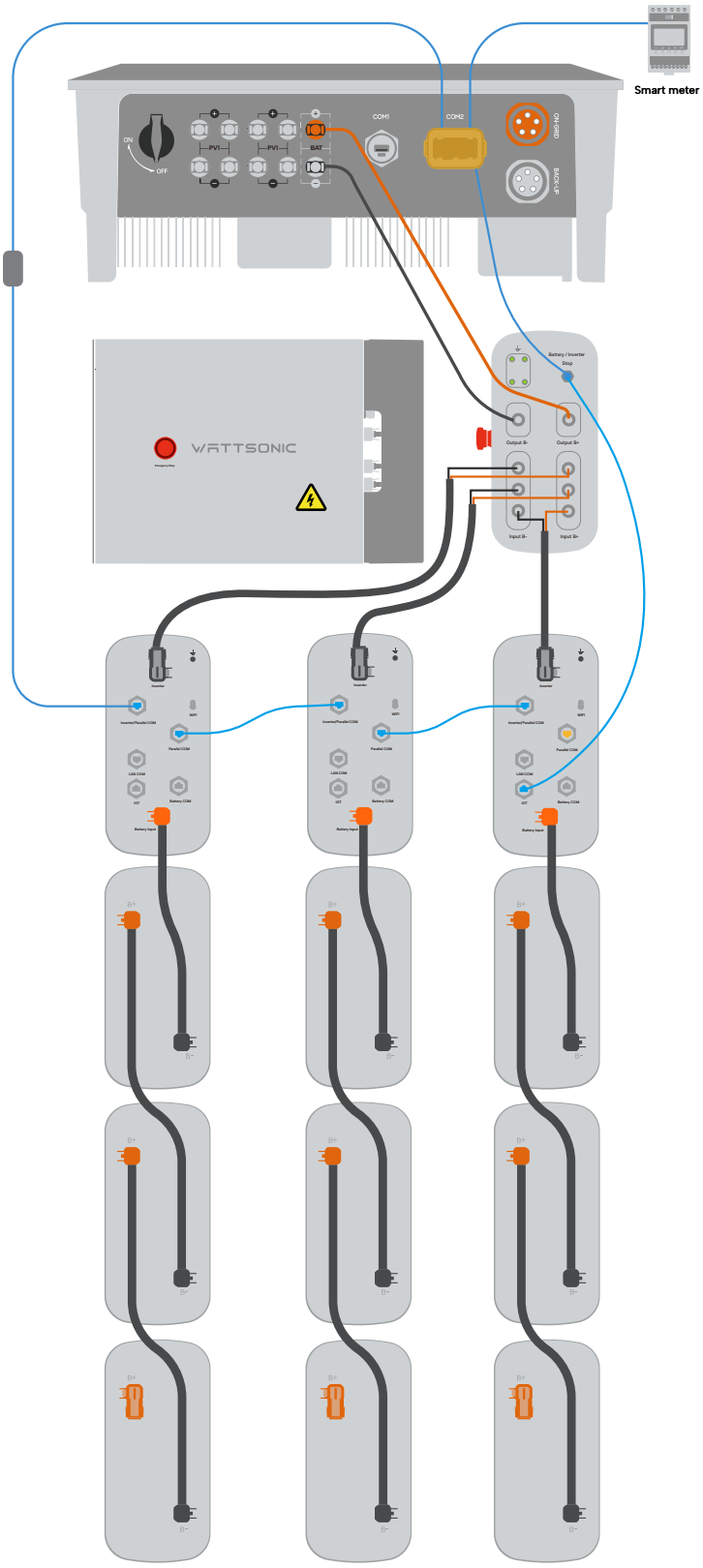
4 Connect the **Battery Input** port of BMS with the **B-**port of the battery by the AIO KIT(Power+COM.+Earthing).

5 Connect the **B+**port of the battery with the next **B-**port of the battery by the AIO KIT, and so on.

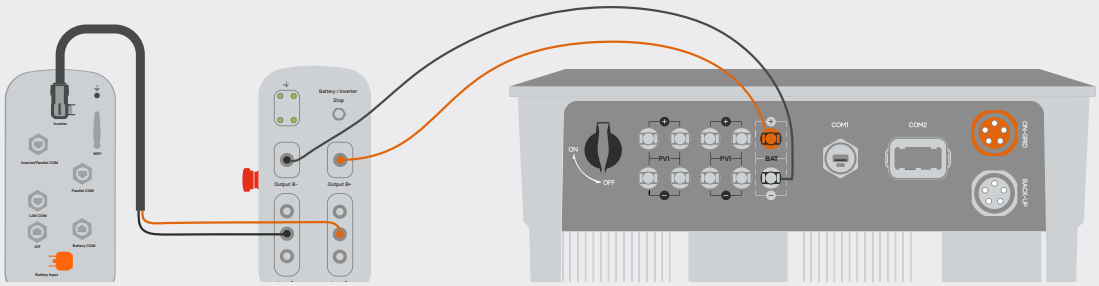
6 Fill the **B+** port of the last battery with the AIO KIT terminal.

7.2.2 Wall mounting (vertical) of multi-string system

Please ensure the main switch of the inverter& BMS is OFF during installation to guarantee high voltage protection.



Power cable connection

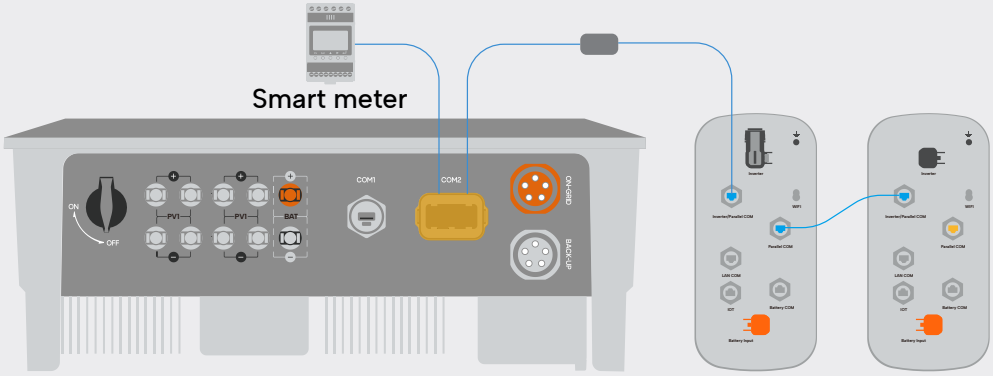


- Using AIO kit to connect BMS& batteries of each string as the figure shows.
- Connect the **Inverter** port of each BMS to the **Battery+** and **Battery−** on the right side of the combiner box using the power cable.

> All length of the power cables between BMS and combiner box need to be the same length to ensure system stability.

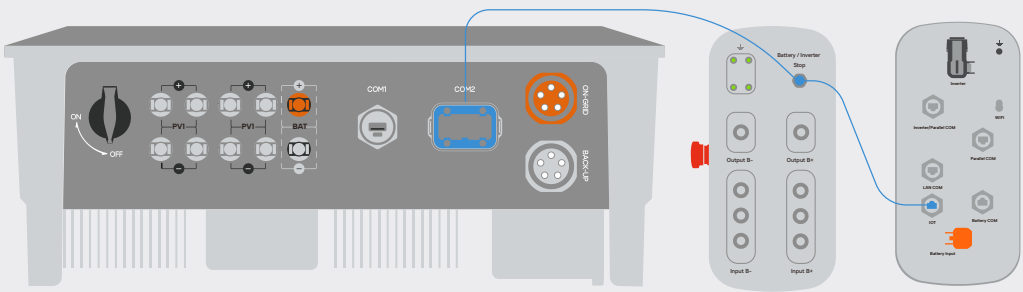
- Connect the **B+** ports on the left side of the combiner box with the **BAT+** port of the inverter by the power cable. The connection on the BAT− port is the same as above.

Communication cable connection



- Connect the **Inverter/Parallel COM** port of the first BMS with the **COM2** port of the Inverter by the integration of the COM cable and the parallel COM cable.
- Connect the **Parallel COM** port of the BMS with the next **Inverter/Parallel COM** port of the BMS by the COM cable, and so on.
- Fill the **Parallel COM** of the last BMS with the COM resistor.
- Connect the **COM2** port of the inverter to the Smart meter with the COM.cable.

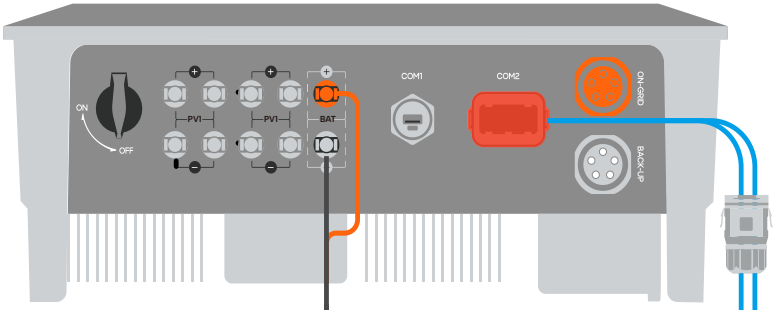
Emergency stop button function connection



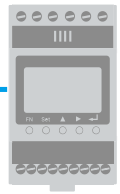
- Connect the **IOT** port of the BMS of the combiner box with the **Battery Stop** port, using the COM cable.
- Connect the **Inverter stop** port of the combiner box with the **COM2** port of the Inverter using the COM cable.

7.2.3 Stack-mounting of single-string system

Please ensure the main switch of the inverter& BMS is OFF during installation to guarantee high voltage protection.

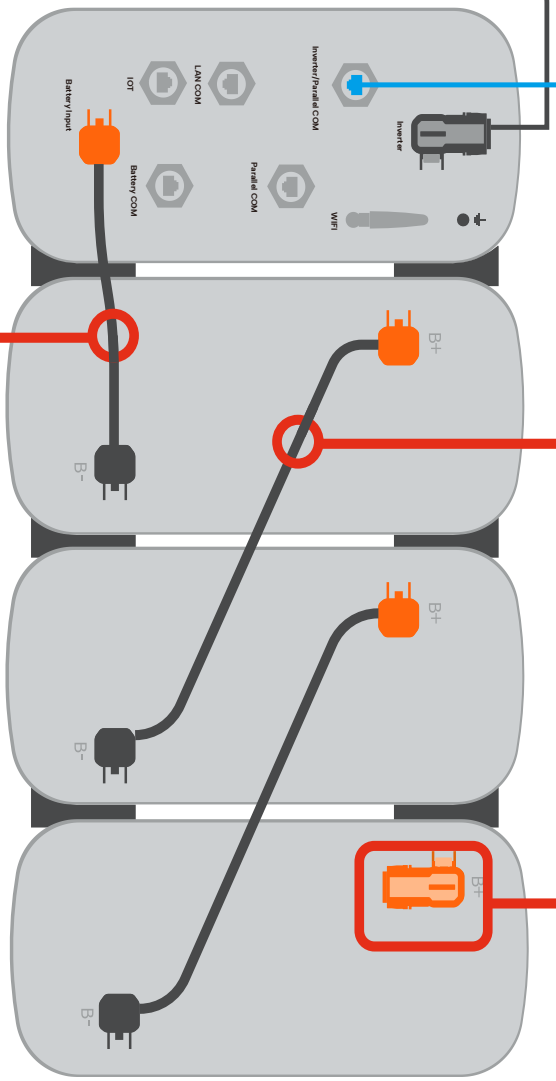


Smart meter



Connect the **BAT+ and BAT-** port of the inverter and the **inverter** port of BMS by the power cable.

1



3

Connect the **COM2** port of the inverter to the Smart meter with the COM.cable.

2

Connect the **Inverter/Parallel COM** port of BMS with the **COM2** port of the inverter by the COM cable.

4

Connect the **Battery Input** port of BMS with the **B-**port of the battery by the AIO KIT(Power+COM.+Earthing)

5

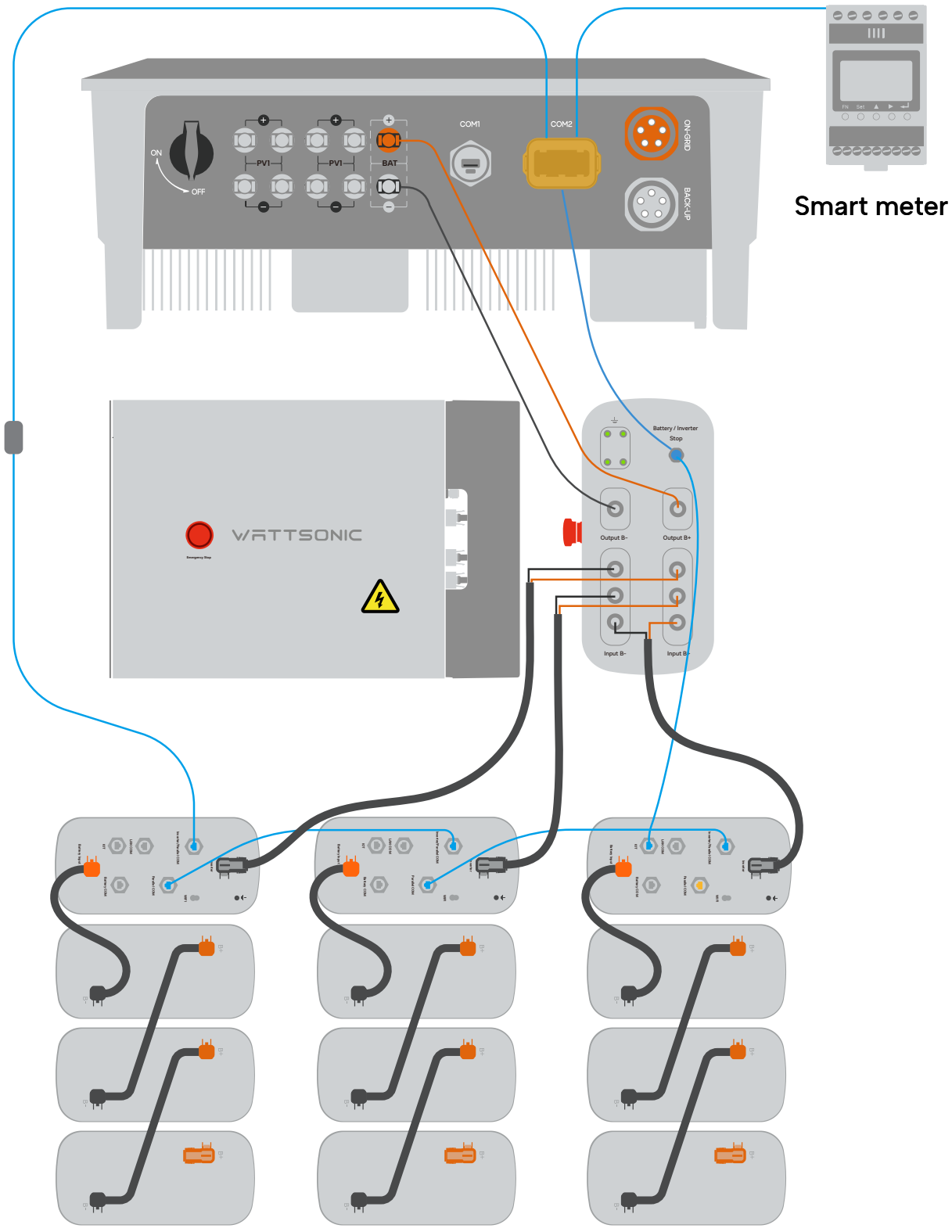
Connect the **B+**port of the battery with the next **B-**port of the battery by the AIO KIT, and so on.

6

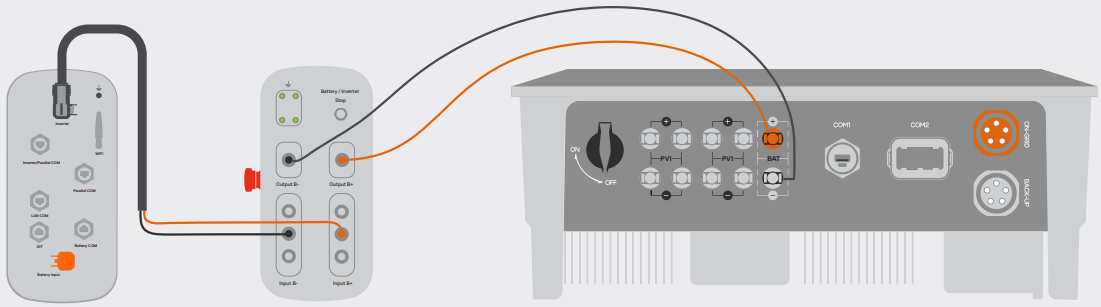
Fill the **B+**port of the last battery with the AIO KIT terminal.

7.2.4 Stack-mounting of multi-string system

Please ensure the main switch of the inverter& BMS is OFF during installation to guarantee high voltage protection.



Power cable connection

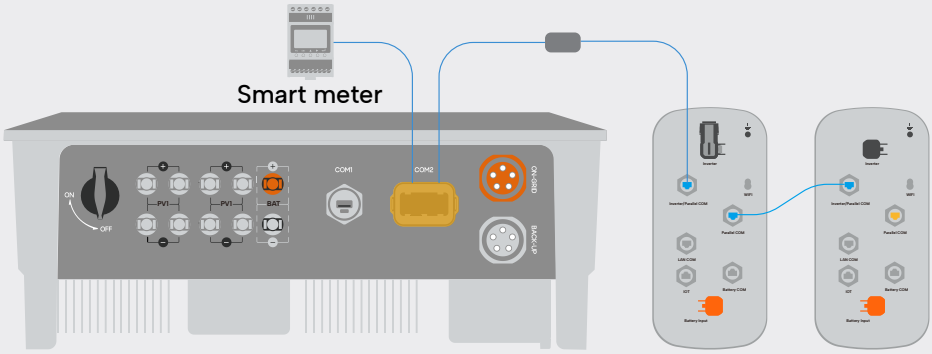


- Using AIO kit to connect BMS& batteries of each string as the figure shows.
- Connect the **Inverter** port of each BMS to the **Battery+** and **Battery−** on the right side of the combiner box using the power cable.

> All length of the power cables between BMS and combiner box need to be the same length to ensure system stability.

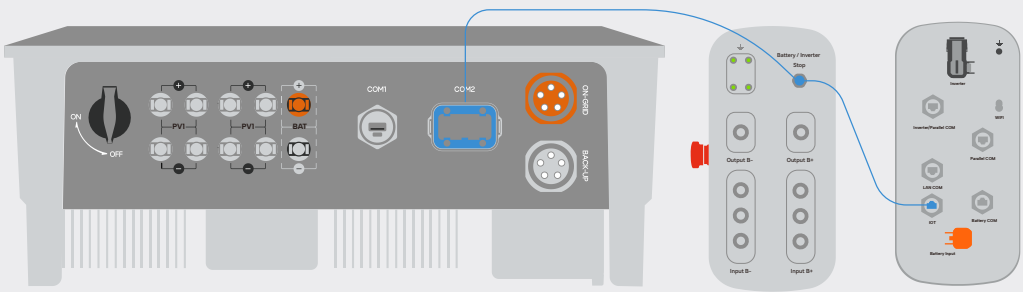
- Connect the **B+** ports on the left side of the combiner box with the **BAT+** port of the inverter by the power cable. The connection on the BAT− port is the same as above.

Communication cable connection



- Connect the **Inverter/Parallel COM** port of the first BMS with the **COM2** port of the Inverter by the integration of the COM cable and the parallel COM cable.
- Connect the **Parallel COM** port of the BMS with the next **Inverter/Parallel COM** port of the BMS by the COM cable, and so on.
- Fill the **Parallel COM** of the last BMS with the COM resistor.
- Connect the **COM2** port of the inverter to the Smart meter with the COM.cable.

Emergency stop button function connection

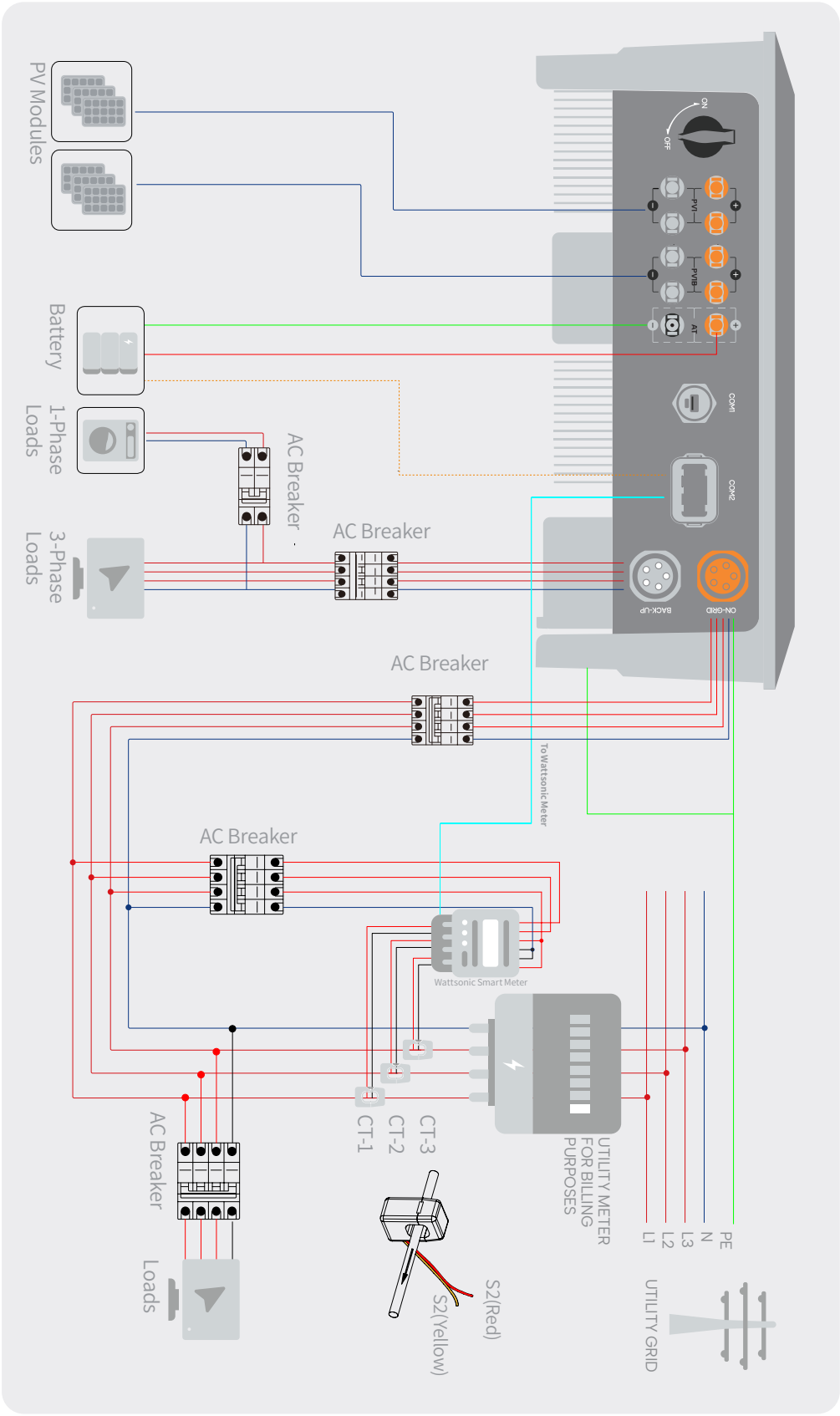


- Connect the **IOT** port of the BMS of the combiner box with the **Battery Stop** port, using the COM cable.
- Connect the **Inverter stop** port of the combiner box with the **COM2** port of the Inverter using the COM cable.

7.3 Inverter connection

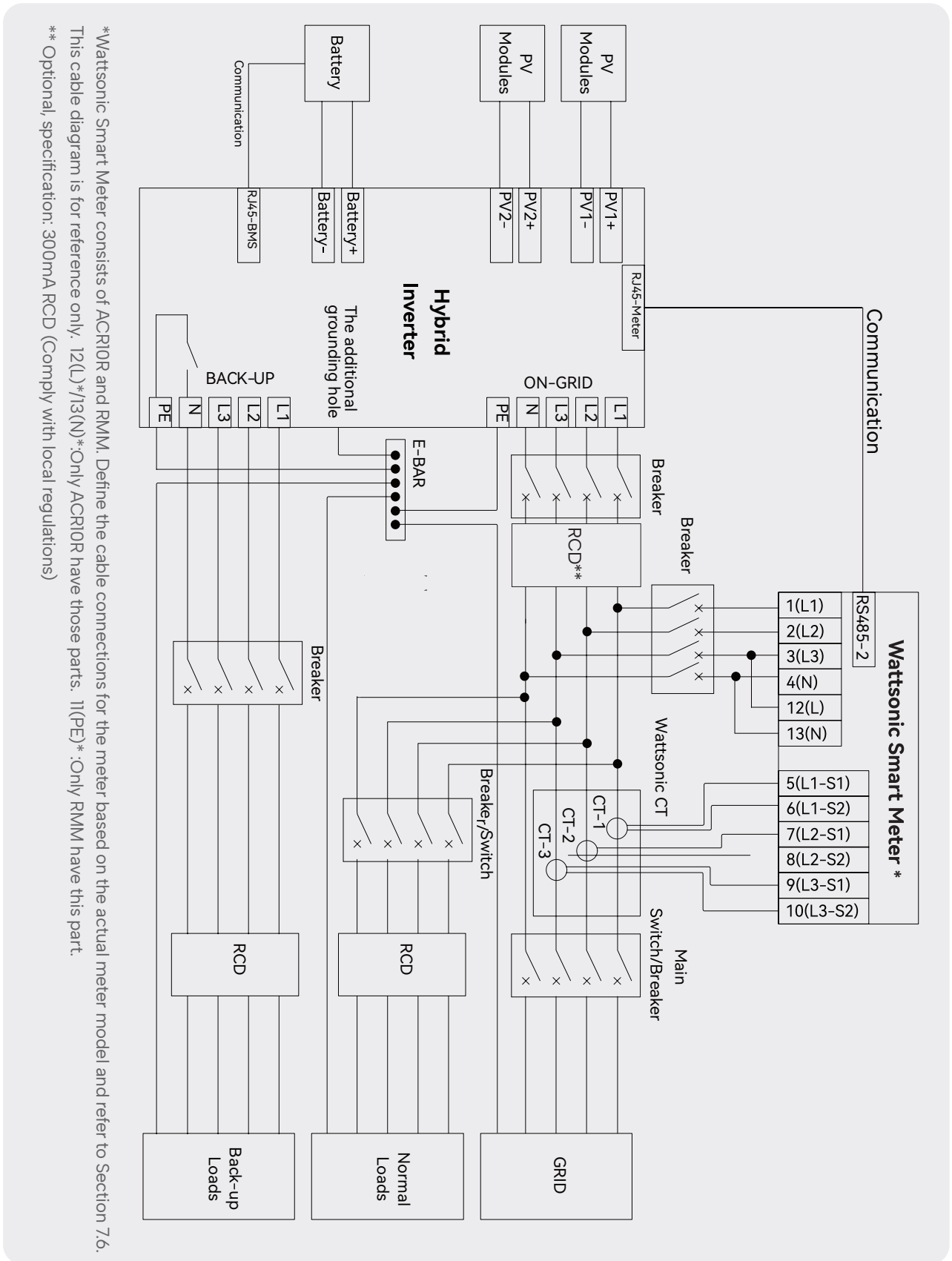
7.3.1 Electrical wiring diagram

This diagram shows Wattsonic 6.0~20.0kW-3P series hybrid inverter wiring structure and composition, concerning the real project, the installation and wiring have to be in line with the local standards.



Single inverter wiring diagram

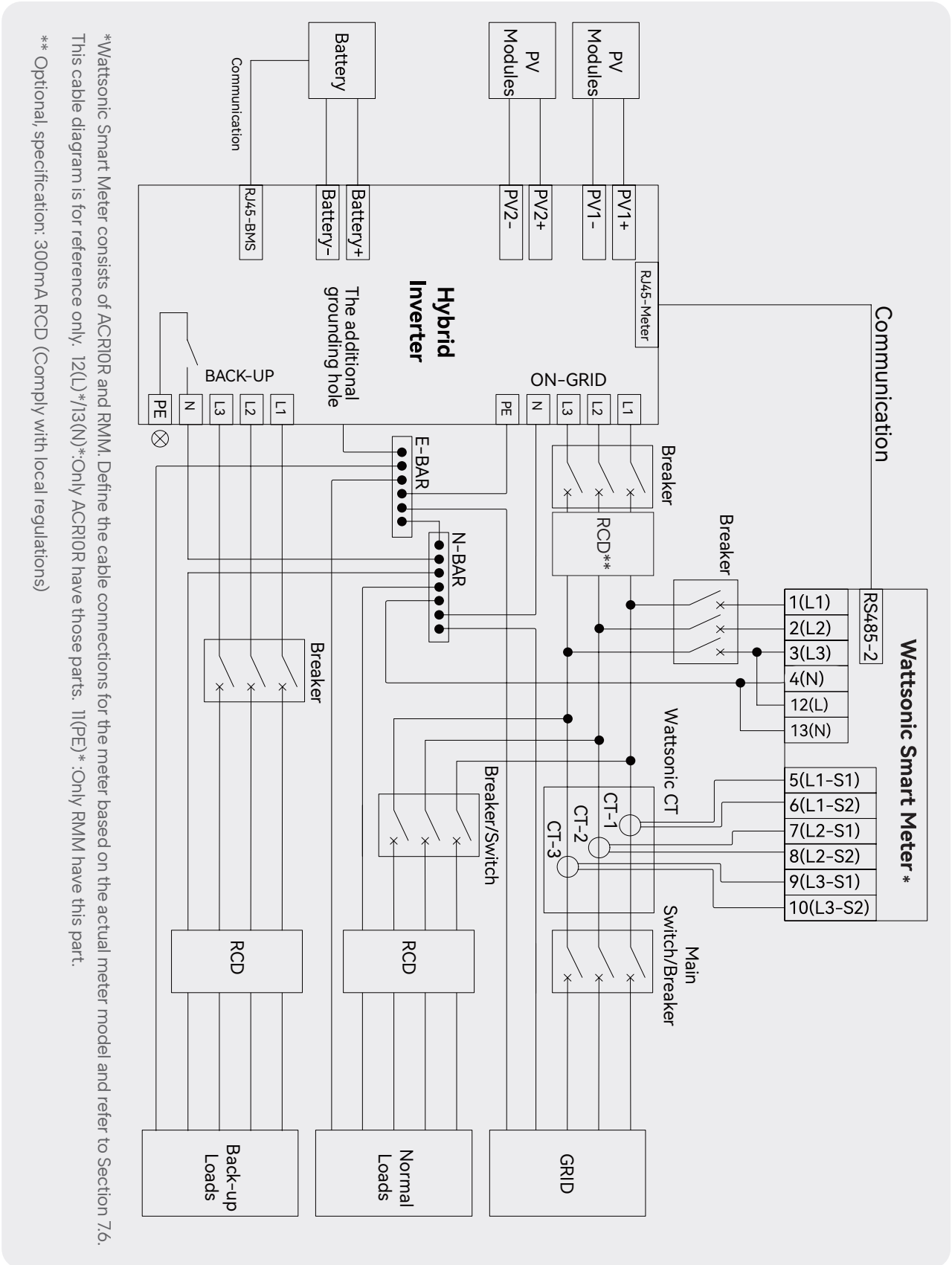
This diagram is an example without a special requirement for an electrical wiring connection.
The neutral line of AC supply can be isolated or switched.



Wattsonic Smart Meter consists of ACR10R and RMM. Define the cable connections for the meter based on the actual meter model and refer to Section 7.6. This cable diagram is for reference only. 12(L)/13(N)*:Only ACR10R have those parts. 11(PE)* :Only RMM have this part.

** Optional, specification: 300mA RCD (Comply with local regulations)

This diagram is an example of Australia and New Zealand. The neutral line of the AC supply must not be isolated or switched, and the neutral line of the GRID side and BACK-UP side must be connected according to the wiring rules AS/NZS_3000. Otherwise, the BACK-UP function will not work.



Wattsonic Smart Meter consists of ACR10R and RMM. Define the cable connections for the meter based on the actual meter model and refer to Section 7.6. This cable diagram is for reference only. 12(L)/13(N)*:Only ACR10R have those parts. 11(PE)* :Only RMM have this part.

** Optional, specification: 300mA RCD (Comply with local regulations)

7.4 AC connection

7.4.1 AC side requirements

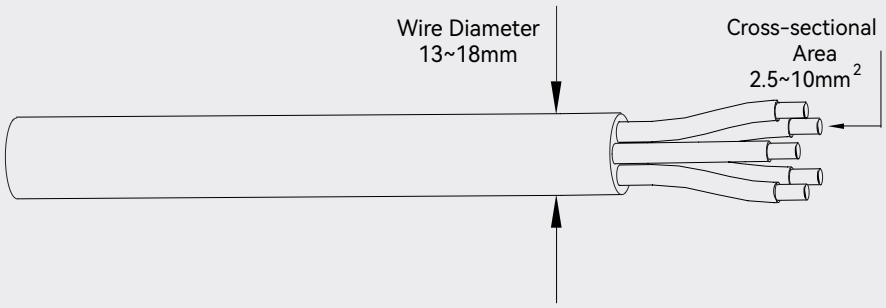
a) An independent AC breaker is required in both the on-grid and backup output sides, and any loads cannot directly connect with the inverter.
b) Before connecting the AC cable, please confirm all DC & AC power sources are disconnected from the inverter.

c) The Wattsonic 6.0~20.0kW-3P series three-phase high voltage hybrid inverter applies to the three-phase power grid with a voltage of 230/400V and a frequency of 50/60Hz.

d) Connect the inverter to the grid only after getting an approval from the local electric power company.

A three-phase AC breaker needs to be installed on the AC side of the 6.0~20.0kW-3P. To ensure that the 6.0~20.0kW-3P 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 6.0~20.0kW-3P AC side.

The allowable AC cable of wire diameter and cross-sectional area for Wattsonic 6.0~20.0kW-3P are as shown in the following:



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

Residual current monitoring device

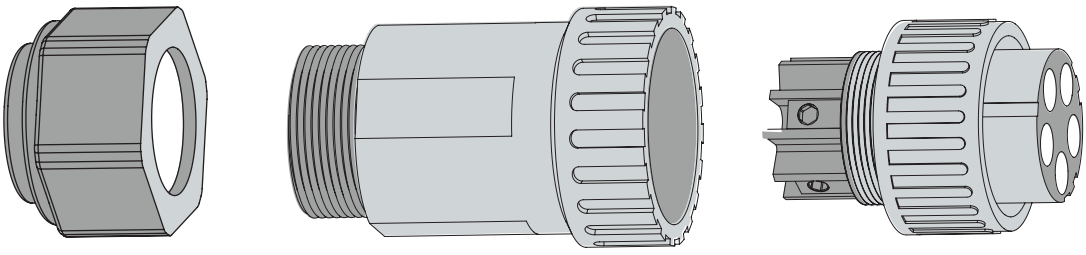
With an integrated universal current-sensitive residual current monitoring unit included, the inverter will disconnect immediately from the mains power once a fault current with a value exceeding the limit is detected.

However, suppose an external residual current device (RCD) is mandatory. In that case, the switch must be triggered at a residual current of 300 mA (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.

7.4.2 Assembling the AC connector

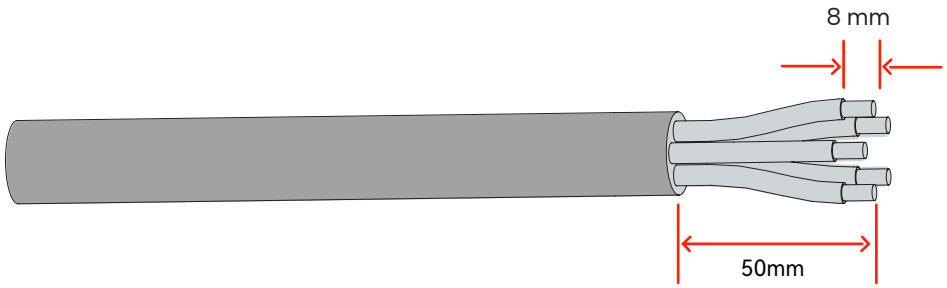
The AC terminal block is on the bottom side of the inverter.

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

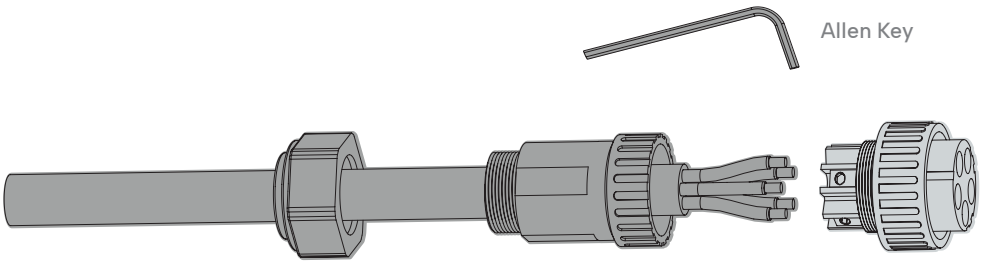


Cable Gland | Threaded Sleeve | AC Terminal Head

b) According to the figure, select an appropriate cable, peel the insulation sleeve of the AC cable off for 50mm, and peel off the end of 3L /PE / N wires for 8mm.

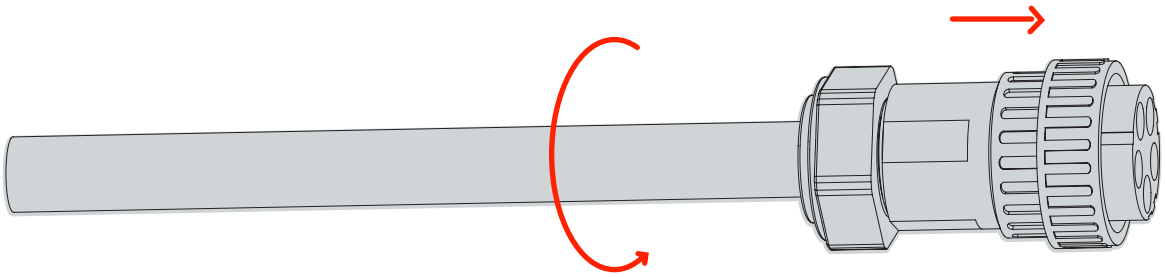


c) Insert the stripped end of the five wires into the appropriate hole of the terminal head. Please try to pull out the cable to make sure it is well connected.



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

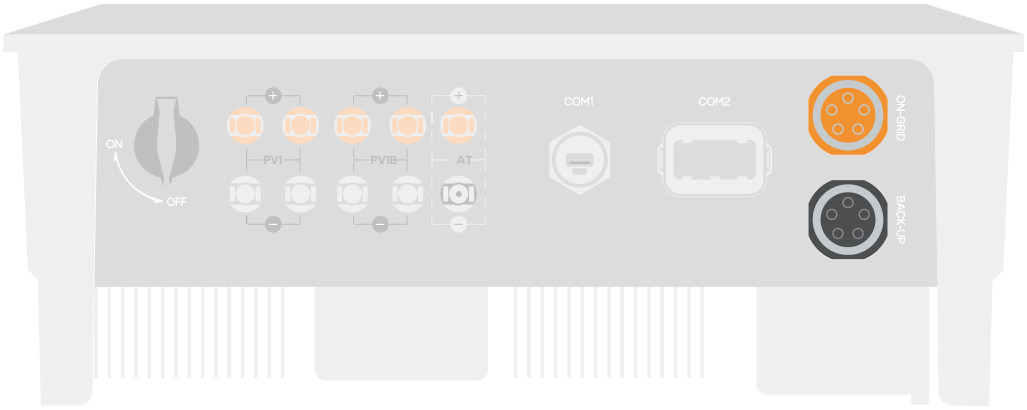
d) According to the arrow direction, push the threaded sleeve to make it connected with the AC terminal head and then rotate the cable gland clockwise to lock it.

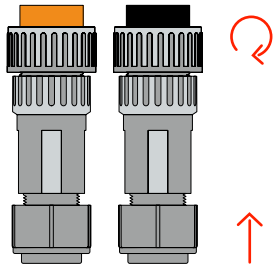


7.4.3 Installing the AC connector

High voltage may be present in the 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 it is tight enough.

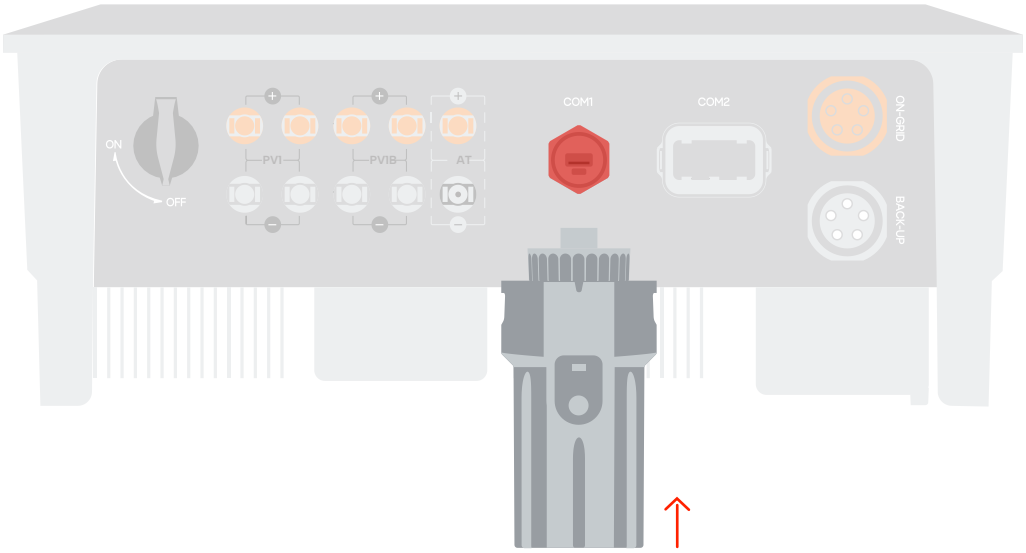




Please distinguish the on-grid and backup ports, and don't mix up the on-grid and backup ports when making the connection.

7.5 Monitoring device installation

Wattsonic 6.0~20.0kW-3P series hybrid inverter supports WIFI, LAN, and 4G communication. Plug the WIFI, LAN, or 4G module into the COM1 port at the bottom of the inverter. A slight "click" sound during the installation indicates the assembly is in place.



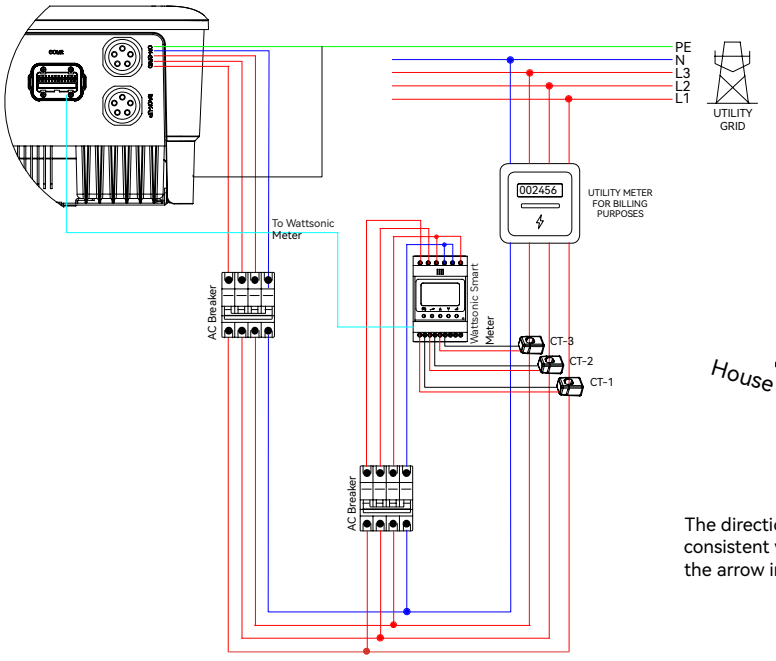
Refer to “10 Monitoring” for more information.

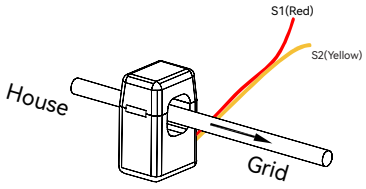
7.6 Meter and CT connection

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. Wattsonic CT cable with a length of 2m is fixed and can’t be extended.

The CTs have been connected to the Wattsonic Meter when you received them, and you just need to follow the wiring diagram in the Meter to join the CT.





The direction of the arrow is consistent with the direction of the arrow inside the CT.

CT installation direction and phase sequence should strictly follow the instructions in the user manual. Otherwise, the inverter may not be working.

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

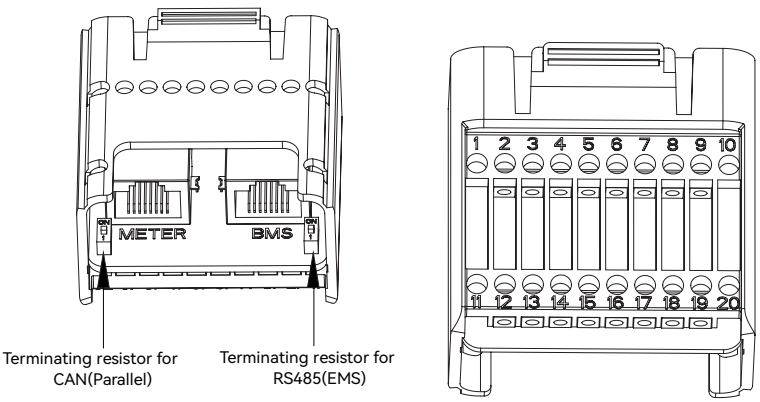
Please choose the appropriate CT size according to your needs.

Meter terminals definition as shown in table below:

NO	Definition		Function
1	L1		L1/L2/L3/N connect to grid to detect power grid voltage
2	L2		
3	L3		
4	N		
5	L1- S1		To detect the CT current and direction
6	L1 - S2		
7	L2- S1		
8	L2 - S2		
9	L3- S1		
10	L3 - S2		
11	/	PE	Ground connection
12	L	/	Power supplied from grid
13	N	/	
RS485	/	Reserve	
	RS485	RS485-2	Communicate with inverter
ANT	/	Reserve	
LAN	/	Reserve	
Type-C	/	Type-C	Specified Debug Interface. Do not use it by non-professionals

7.7 Communication connection

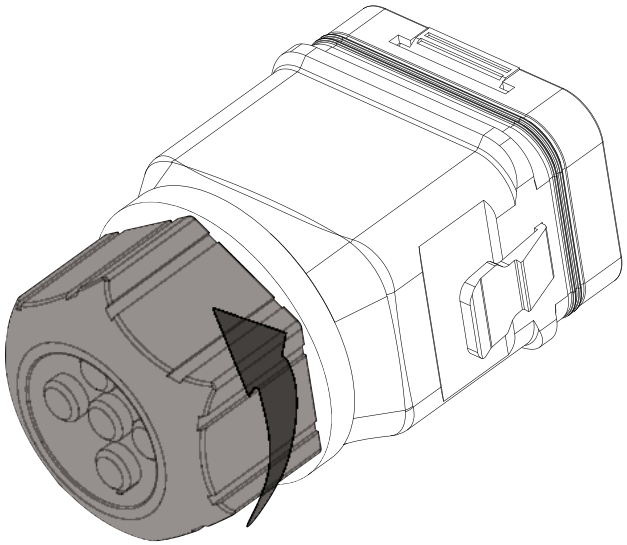
All communication ports are in the multifunction communication port at the bottom of the inverter. There are the Meter port, CAN port, BMS port, EMS port, RLYOUT port, and DRED port.



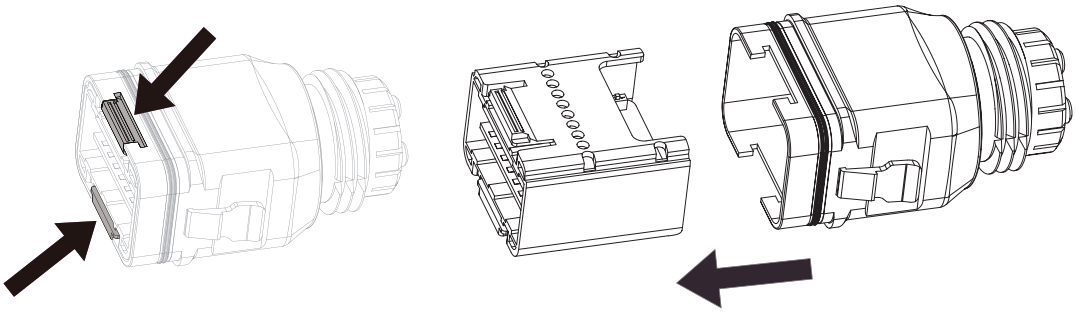
Pin	Definition	Function
METERRJ45-1	RS 485	Communicate with Meter
RJ45-2	CAN	Communicate with BMS
1	COM	
2	NO (Normally Open)	Multifunction Relay
3	/	Reserved
4	/	Reserved
5	DRM4/8	DRED For Australia and New Zealand
6	DRM3/7	
7	DRM2/6	
8	DRM1/5	
15	COM D/0	
16	REF D/0	
11	Fast stop +	Emergency stop
12	Fast stop -	
13	485 B1	EMS
14	485 A1	
17	CANL_P	CAN for parallel connection of inverters
18	CANH_P	
19	/	Reserved
20	/	Reserved

7.7.1 Assembling the Multi-COM connector

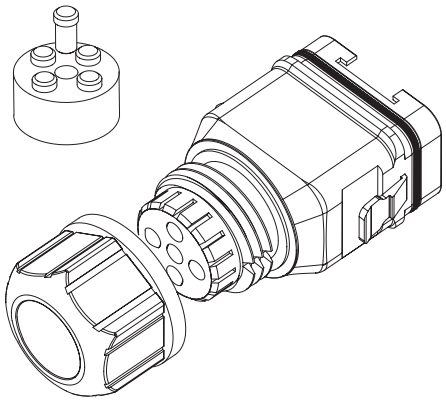
1) Unscrew the swivel nut from the connector.



2) Take out the terminal block.



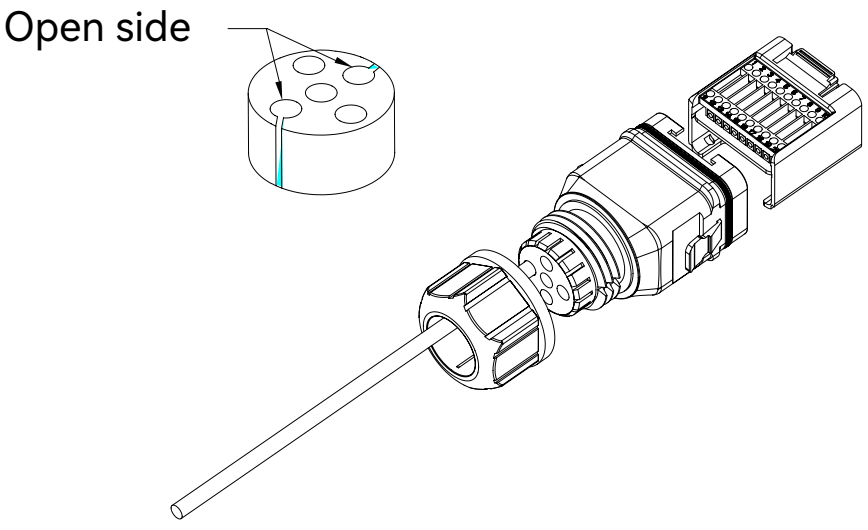
3) Remove the seal and lead the cable through the cable gland.



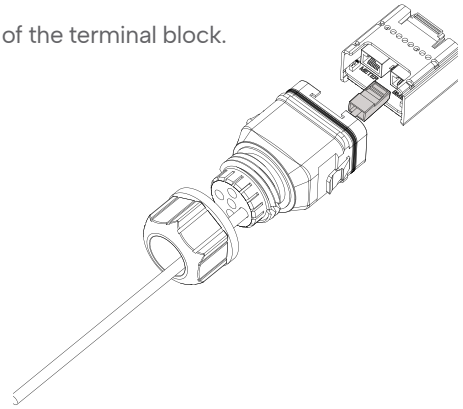
7.7.2 Connect the Meter and BMS communication cables

The communication between the meter/BMS and inverter is RJ45 interface cable.
The communication cable of the meter is 10M, and the cable of BMS is 3M.

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



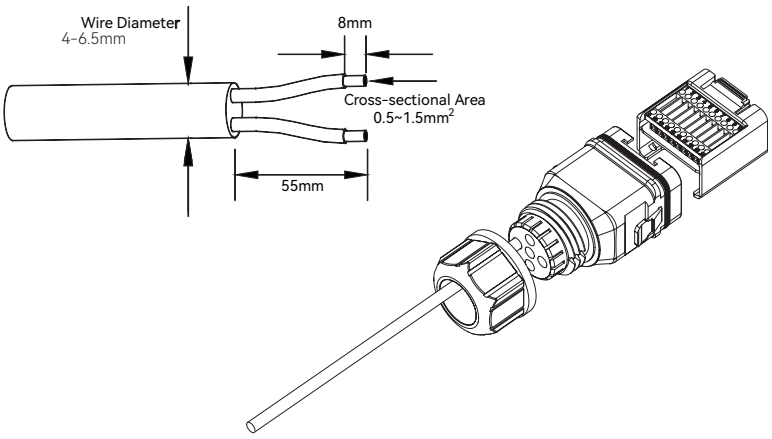
2) Insert one side of the RJ45 plug into the RJ45 port of the terminal block.



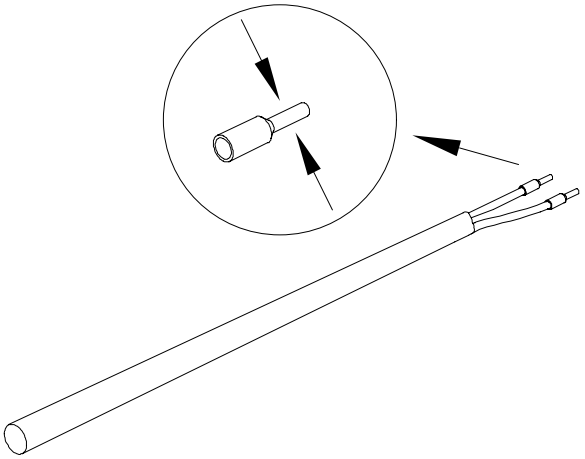
3) Insert another side of the communication cable into the meter RS485 port or BMS CAN port.

7.7.3 Connect other cables

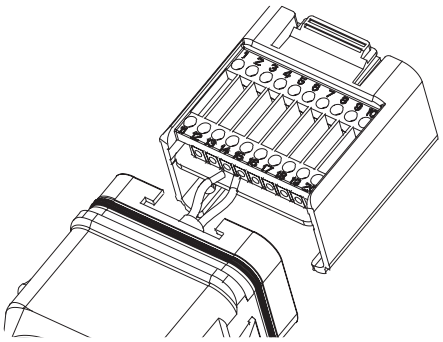
1) Thread the cable of appropriate length through the swivel nut and the housing. Remove the cable jacket and strip the wire insulation.



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.

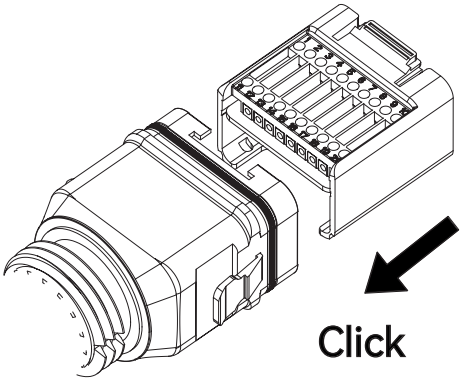


3) Fix all the wires to the terminal plug according to the assignment and tighten to a torque of 1.2+/-0.1N·m with a screwdriver.

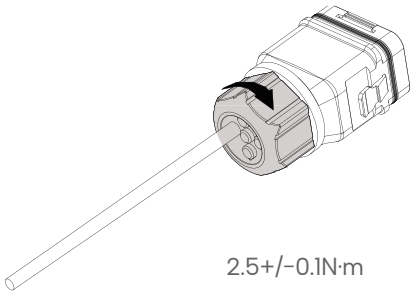


4) Pull the wires outward to check whether they are firmly installed.

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



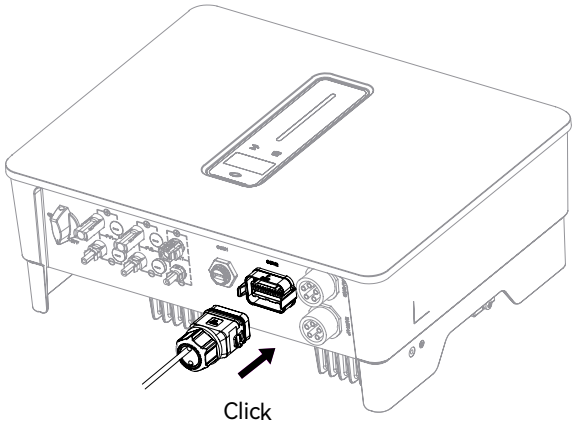
5) Fasten the swivel nut.



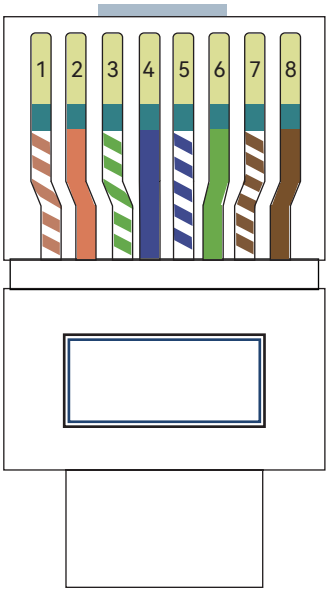
7.7.4 Installing the COM connector

1) Remove the waterproof lid from the COM terminal.

2) Insert the COM connector into the COM terminal on the bottom of the inverter until there is an audible click.



7.7.5 Meter and BMS communication



No.	Color	Meter Side	Battery Side
1	Orange & White	/	RS485_A3
2	Orange	/	RS485_B3
3	Green & White	RS485_B2	/
4	Blue	/	CANH_B
5	Blue & White	/	CANL_B
6	Green	RS485_A2	/
7	Brown & White	RS485_B2	/
8	Brown	RS485_A2	/

7.7.6 EMS communication

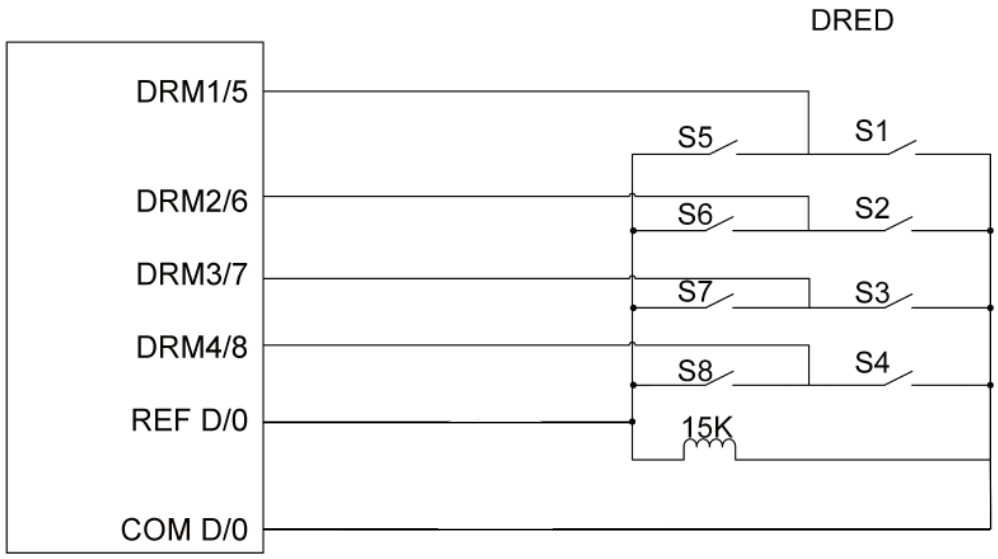
An EMS communication cable needs to be connected to control the operation of a hybrid inverter through the EMS, and communication between EMS and inverter is RS485.

7.7.7 DI ctrl

DRED

DRED interface is specially reserved for Australia and New Zealand according to their safety regulation, and Wattsonic doesn't provide the DRED device for the customer.

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

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

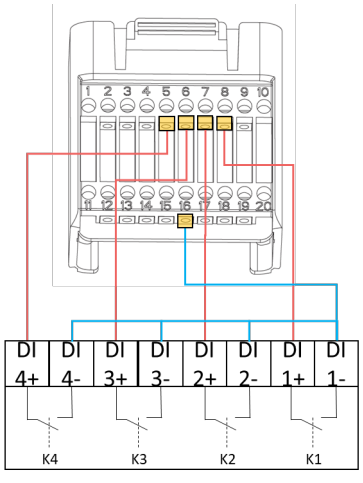
RCR

RCR (Ripple Control Receiver) interface is special reserved for Germany and some other

European country according to their safety regulation, and Wattsonic 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

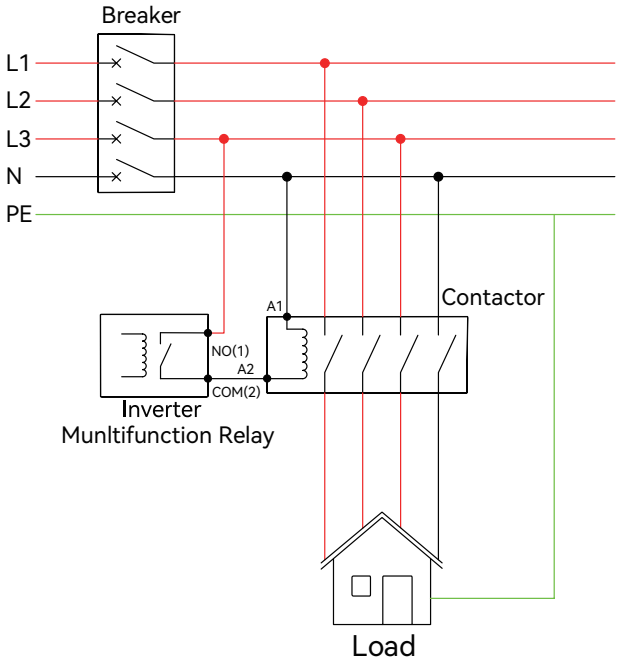
7.7.8 Multifunction relay

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.

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

For more installation and setup information, please contact Wattsonic.

Load control

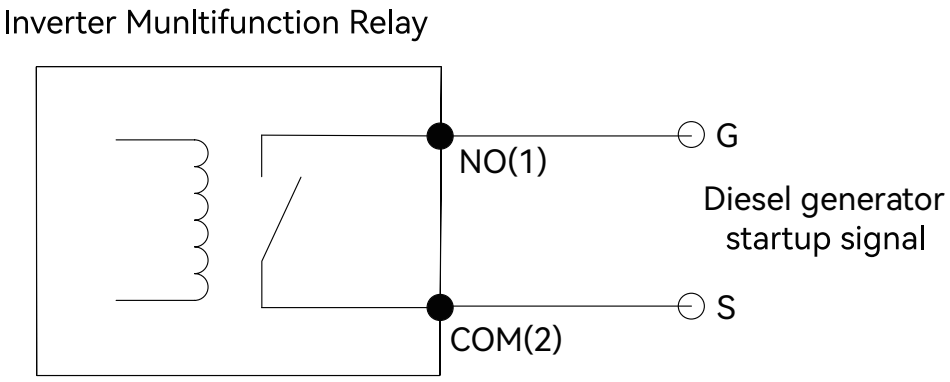


The AC contactor should be placed between the inverter and the loads. Do not connect the load to DO port directly.

The company of Wattsonic does not supply the contactor. 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.

Generator control



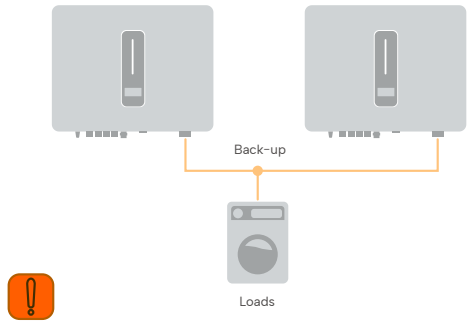
When the "GEN signal" is active, the open contact (GS) will switch on (no voltage output).

7.7.9 Parallel system

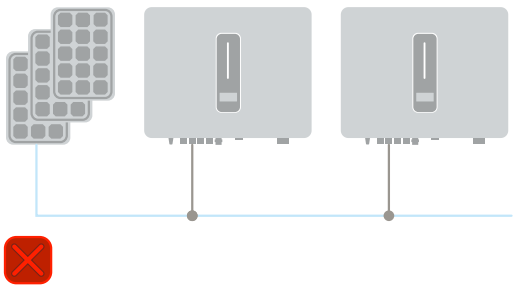
For advanced applications, please contact our after-sales department.

For more installation and setup information about parallel systems, please contact Wattsonic.

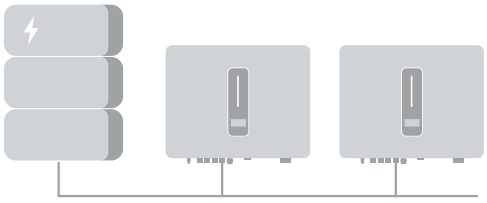
Testing to AS/NZS 4777.2:2020 for multiple inverter combinations has not been conducted.



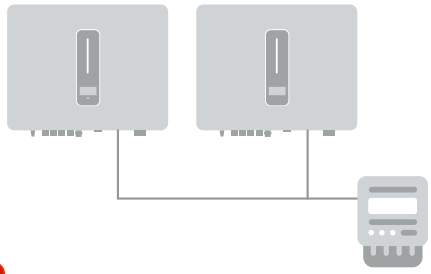
For the general version, the backup cannot connect in parallel. For advanced applications, please get in touch with our after-sales department.



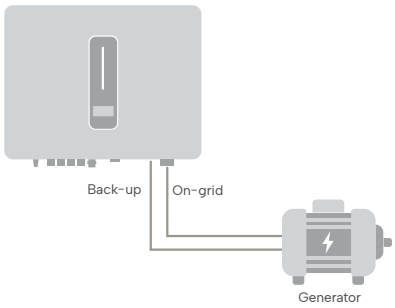
Single PV string cannot connect to multiple inverters.



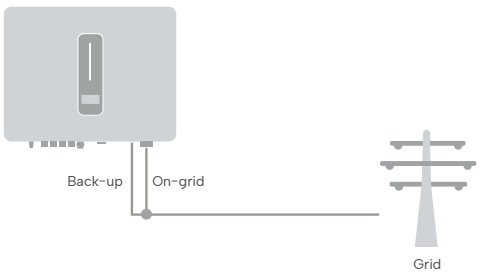
One battery bank cannot be connected to multiple inverters.



One meter cannot be connected to multiple inverters. Different CTs cannot connect to the same line cable.



The on-grid and back-up side cannot be connected to and generator directly.



The back-up side cannot be connected on-grid side or grid.

7.8 PV string connection

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 the electrical connection.

PV Max. Input voltage is 950V without battery or 850V with battery. Otherwise, the inverter will be waiting.

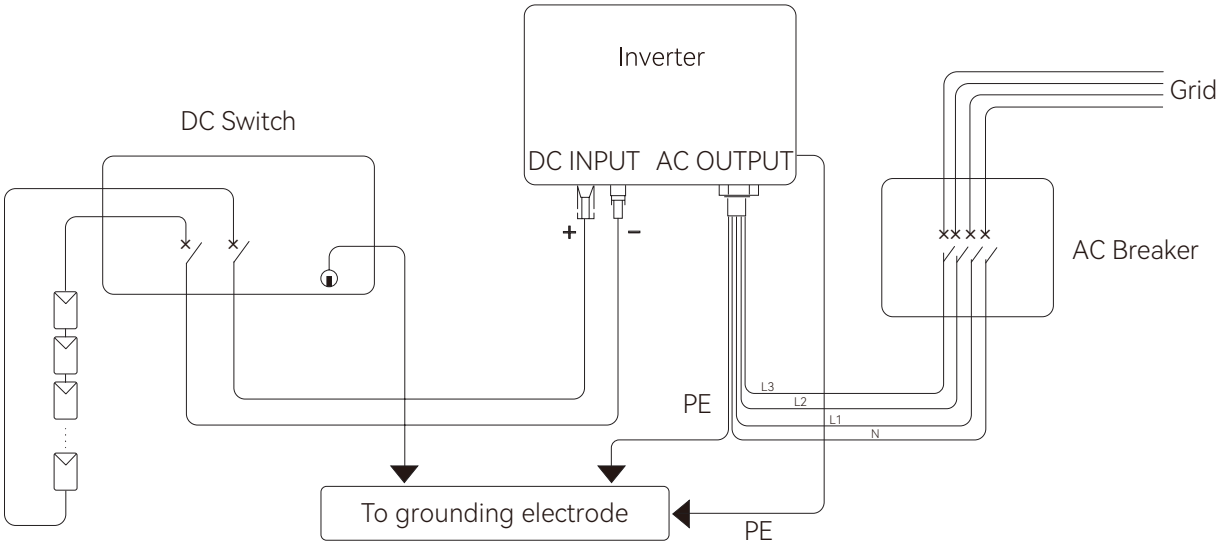
For best practice, ensure PV modules of the same model and specifications are connected in each string.

7.8.1 PV side requirements

System layout of units with external DC switch

1) Local standards or codes may require that PV systems are fitted 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 60947.4:2018 and AS/NZS IEC 60947.2:2020 in the Australian and New Zealand markets. The Max. current of the DC switch matched by the 6.0~20.0kW-3P inverter is no less than 40A. We recommend the following electrical connection.



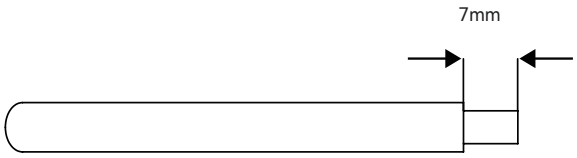
Select the appropriate photovoltaic cable

Cable requirements		Cable stripping length
Outside diameter	Conductor core section	
5.9-8.8 mm	4 mm²	7 mm

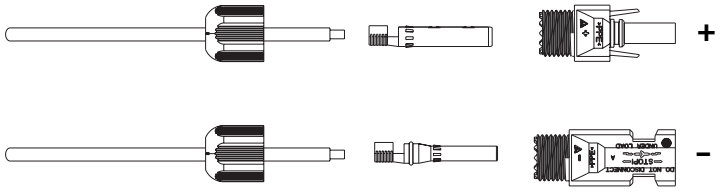
7.8.2 Assembling the PV connector

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

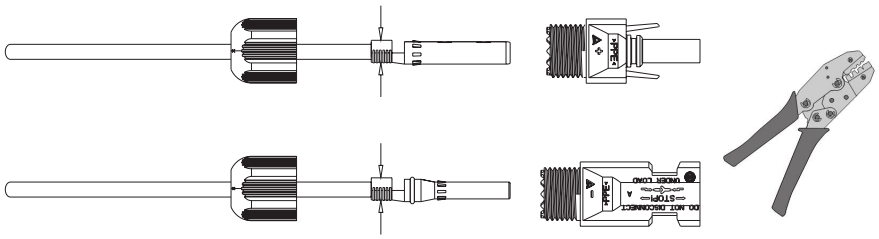
1) Peel off the DC cable insulation sleeve for 7 mm.



2) Disassemble the connector in the accessory bag.

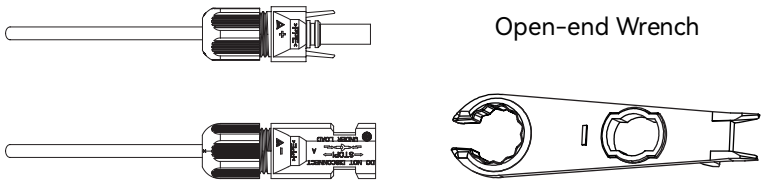


3) Insert the DC cable through the DC connector nut into the metal terminal and press the terminal with a professional crimping plier (pull back the cable with some power to check if the terminal is well connected to the cable).



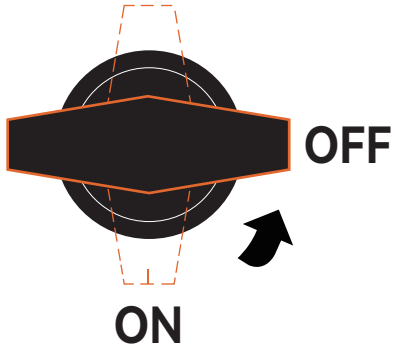
4) Insert the positive and negative cables into the corresponding positive and negative connectors, pull back the DC cable to ensure that the terminal is tightly attached to the connector.

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

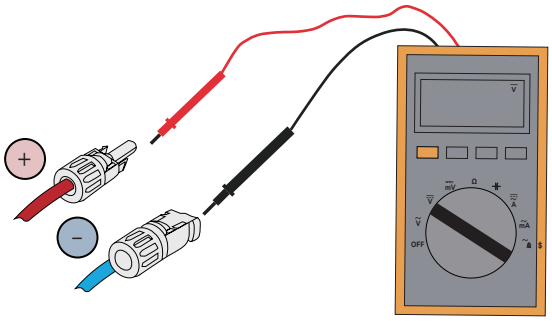


7.8.3 Installing the PV connector

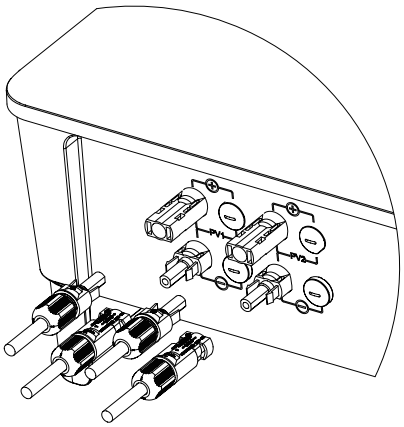
1) Rotate the DC switch to the "OFF" position.



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 1,000V. The input voltage is 950V without a battery or 850V with a battery; otherwise, the 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.

7.9 Power cable of the battery connection

Please contact your battery supplier for detailed battery installation information.

7.9.1 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.

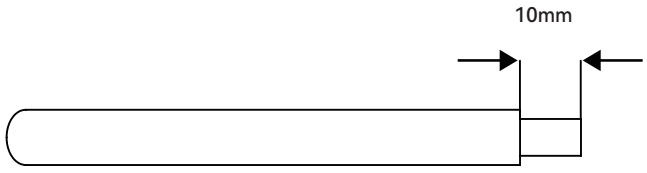
7.9.2 Assembly procedures of the lithium battery connector

Select an appropriate DC cable

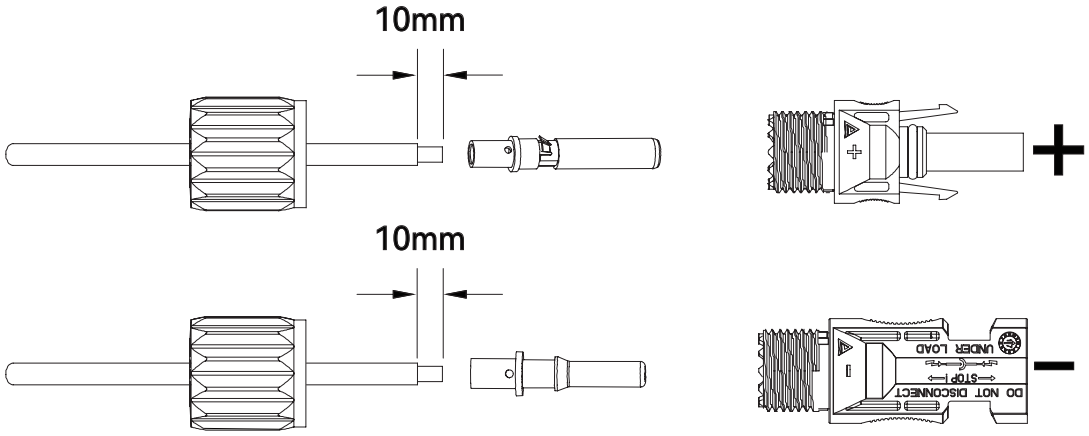
Cable requirements		Cable stripping length
Outside diameter	Conductor core section	
5.0-8.0 mm	6 mm²(10AWG) 10 mm²(8AWG)	8 mm 10 mm

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 Wattsonic to purchase terminals of other specifications.

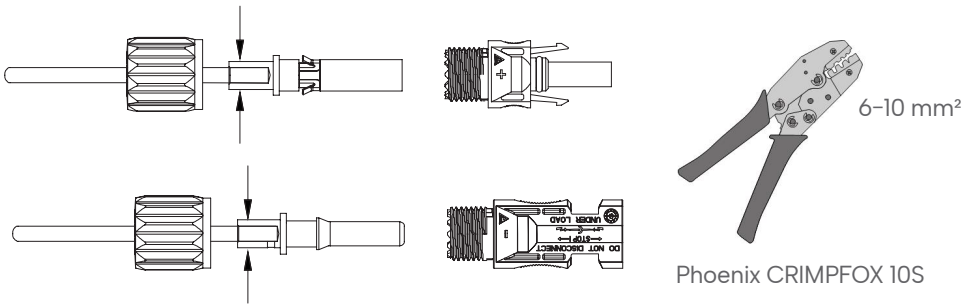
1) Peel off the battery cable insulation sleeve for 10 mm.



2) Disassemble the connector in the accessory bag.

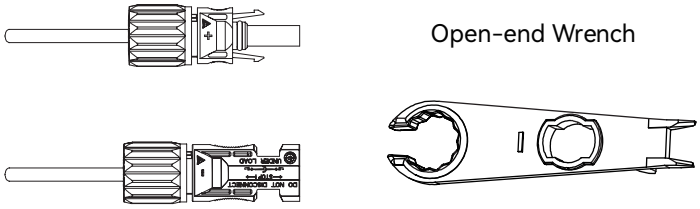


3) Insert the battery cable through the battery connector nut into the metal terminal and press the terminal with a professional crimping plier (pull back the cable with some power to check if the terminal is well connected to the cable).



4) 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.

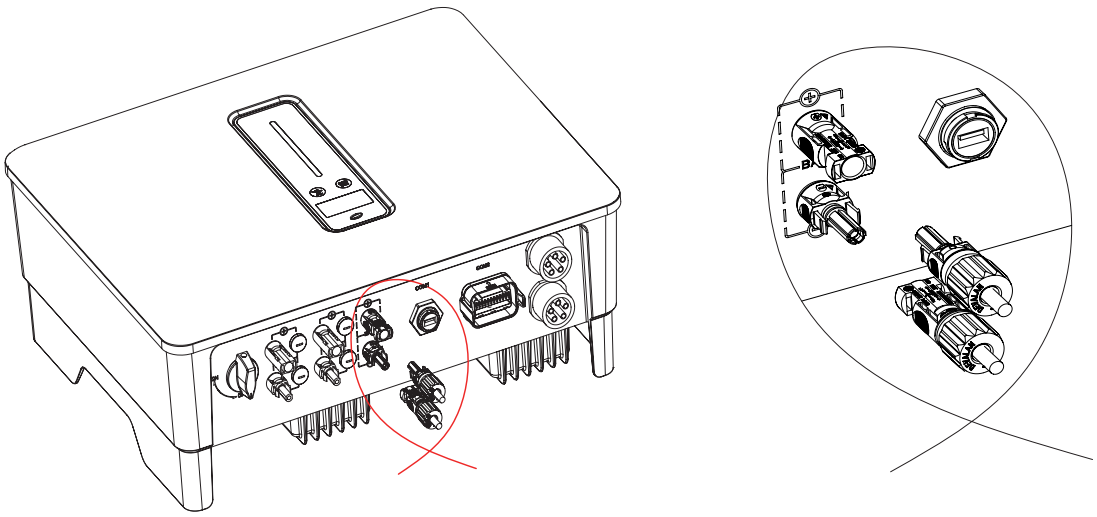
5) Use an open-end wrench to screw the nut to the end to ensure that the terminal is well sealed.



1) Before making the battery connector, please ensure the cable's polarity is correct.

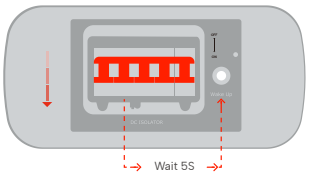
2) Use a multimeter to measure the voltage of the battery pack and ensure that the voltage is within the inverter limitation and the polarity is correct.

6) Insert the positive and negative connector into the inverter battery terminals respectively, and a “click” sound represents the assembly in place.



7.10 System start and stop

7.10.1 Start the system

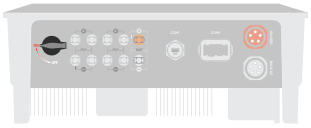


1. 1. Turn on the DC switch on the Master BMS.

2. Wait for more than 5 seconds.

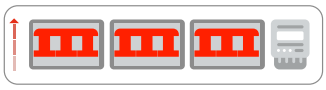
3. Turn on the Wake Up switch.

4. The system starts successfully when the display shows correct system information.



5. Turn the inverter DC switch to the “ON” position to ensure the successful PV injection.

6. Turn on all the AC breakers of the Distribution Box as shown.



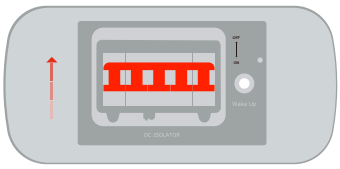
Warning: Please don't try to switch off Master BMS during regular charge and discharge, which has high risk to damage BMS inside core components.

7.10.2 Stop the system

1. Check and confirm there is no load connection.

If a load is still running, disconnect the communication cable between the BMS and Inverter, then the load will shut down automatically.

2. Turn off the DC Switch on the Master BMS and disconnect the DC breaker on the battery side (if any).



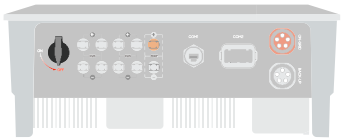
3. Stop the inverter

(1) Shut down the inverter through the APP or the button on the display first.

(2) Disconnect the breakers on the grid and load sides.

Wait 30S

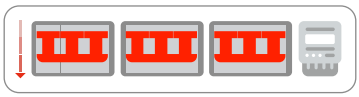
(3) Wait 30 seconds and turn the inverter DC switch to the “OFF” position. At this time, there is still power in the inverter capacitor. Wait for 10 minutes until the inverter is completely de-energized before operating.



(4) Disconnect the AC and DC cables.

Wait 10 min

4. Turn off all the AC breakers of the Distribution Box as shown.

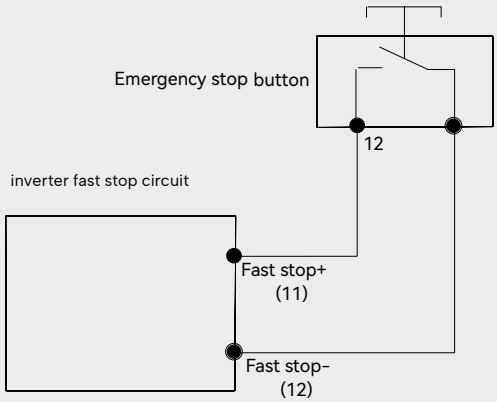


7.10.3 Emergency stop function

Wattsonic 6.0~20.0kW-3P hybrid inverter comes standard with an emergency stop function, and you can use this function by connecting an external switch to the fast stop interface if it is required in the installation place. The external switch isn't included in our accessory box.

Single-string system

The COM2 port of the inverter and the IOT port of the BMS are connected to the emergency stop module to implement the emergency stop function.



Multi-string system

Press the emergency red stop button on the front of the combiner box to achieve the emergency stop function.

Press the button: Emergency stop.

Rotate the button clockwise: Revert to the starting position and restore the connection status.

Shutdown the inverter (Emergency Stop)

The manual, the inverter has Emergency Stop function, which can shut the inverter down. Connect the external Emergency Stop device and send an emergency stop signal to the inverter to shut down the inverter.

Turn on the Inverter after Shutdown (Emergency Stop)

Cancel the emergency stop signal from the external Emergency Stop device and the inverter will restart.

Commissioning

8.1 App preparation

1) Install the local configuration App and the cloud monitoring App with the latest versions. Refer to "10.1.1 Cloud Monitoring App and 10.1.2 Local Configuration App".

2) Register an account on the Cloud monitoring App. If you have the account and password from the distributor, installer, or Wattsonic, skip this step.

8.2 Inspection before commissioning

Check the following items before starting the inverter:

1) All equipment has been reliably installed.

2) DC switch(es) and AC circuit breaker are in the "OFF" position.

3) The ground cable is appropriately and reliably connected.

4) The AC cable is appropriately 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 are).

9) The AC circuit breaker is selected following the requirements of this manual and local standards.

10) All warning signs & labels are intact and legible.

8.3 Commissioning procedure

If all the above items meet the requirements, start the inverter for the first time.

1) Turn on the AC breaker.

2) Turn on the lithium battery switch. Power on the battery pack manually if a battery is equipped.

3) Turn on the DC switch, which could be integrated inside the inverter. Or it can be installed by the customer.

4) The inverter will work adequately after turning on the DC and AC breakers, provided the weather and grid meet the requirements. The time for entering the operating mode may vary according to the chosen safety code.

5) Observe the LED indicator to ensure that the inverter usually operates.

6) After the inverter is started, please refer to the [QUICK USE GUIDE] which is attached to the access to configure the inverter.

Check the country code and battery ID settings if the inverter fails.

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

2) Select the battery ID suitable for the battery that is installed.

CT AUTO TEST FUNCTION

Wattsonic 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.

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 it is unnecessary, you can manually turn off the function. We recommend enabling this function.)

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

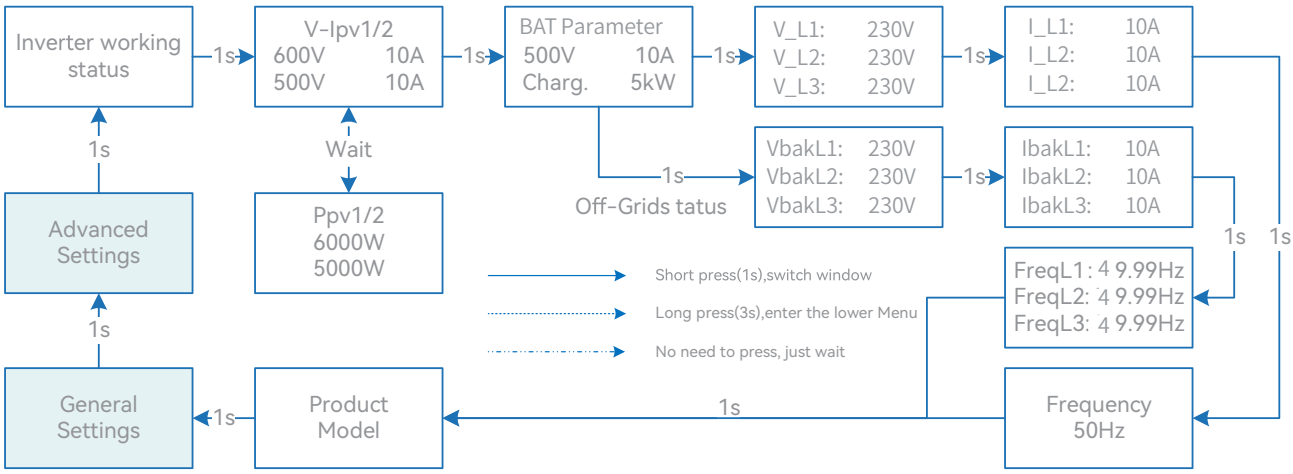
Screen Operation

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 modify the settings of the inverter.

If the parameter is a number, short press to change the number, long press to confirm the number and jump to the next number.

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

9.1 Main window



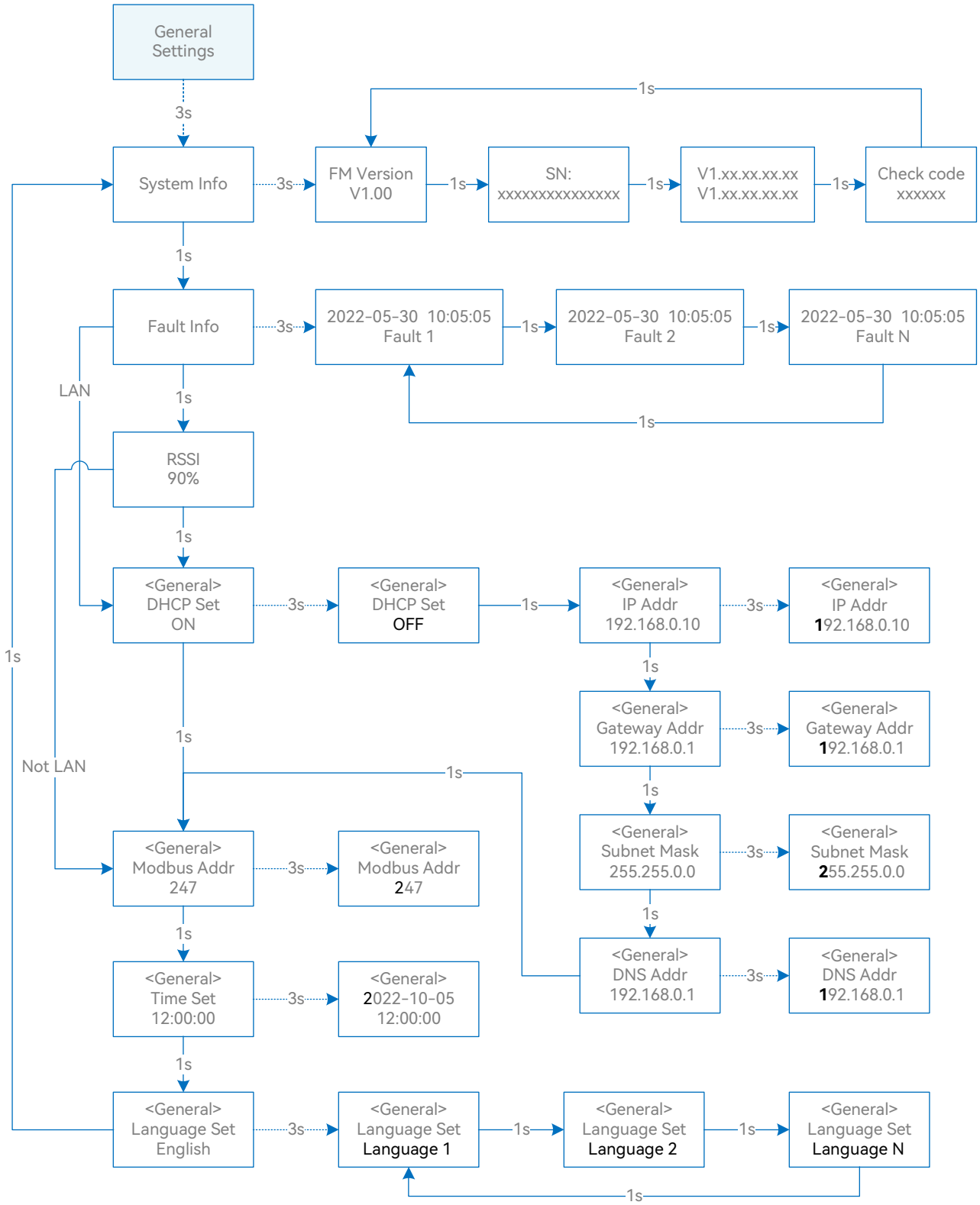
Inverter working status
Waiting/Checking/On-Grid/Off-Grid/Fault Info/FW Updating

MHT-OLED-01-EN

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
Disch.	Discharge
V_L1: / V_L2: / V_L3:	Three-phase AC voltage (On-Grid status)
VbakL1: / VbakL2: / VbakL3:	Three-phase AC voltage (Off-Grid status)
I_L1: / I_L2: / I_L3:	Inverter output current (On-Grid status)
IbakL1: / IbakL2: / IbakL3:	Inverter output current (Off-Grid status)
FreqL1: / FreqL2: / FreqL3:	Inverter output Frequency (Off-Grid status)
FW Updating	Firmware Updating

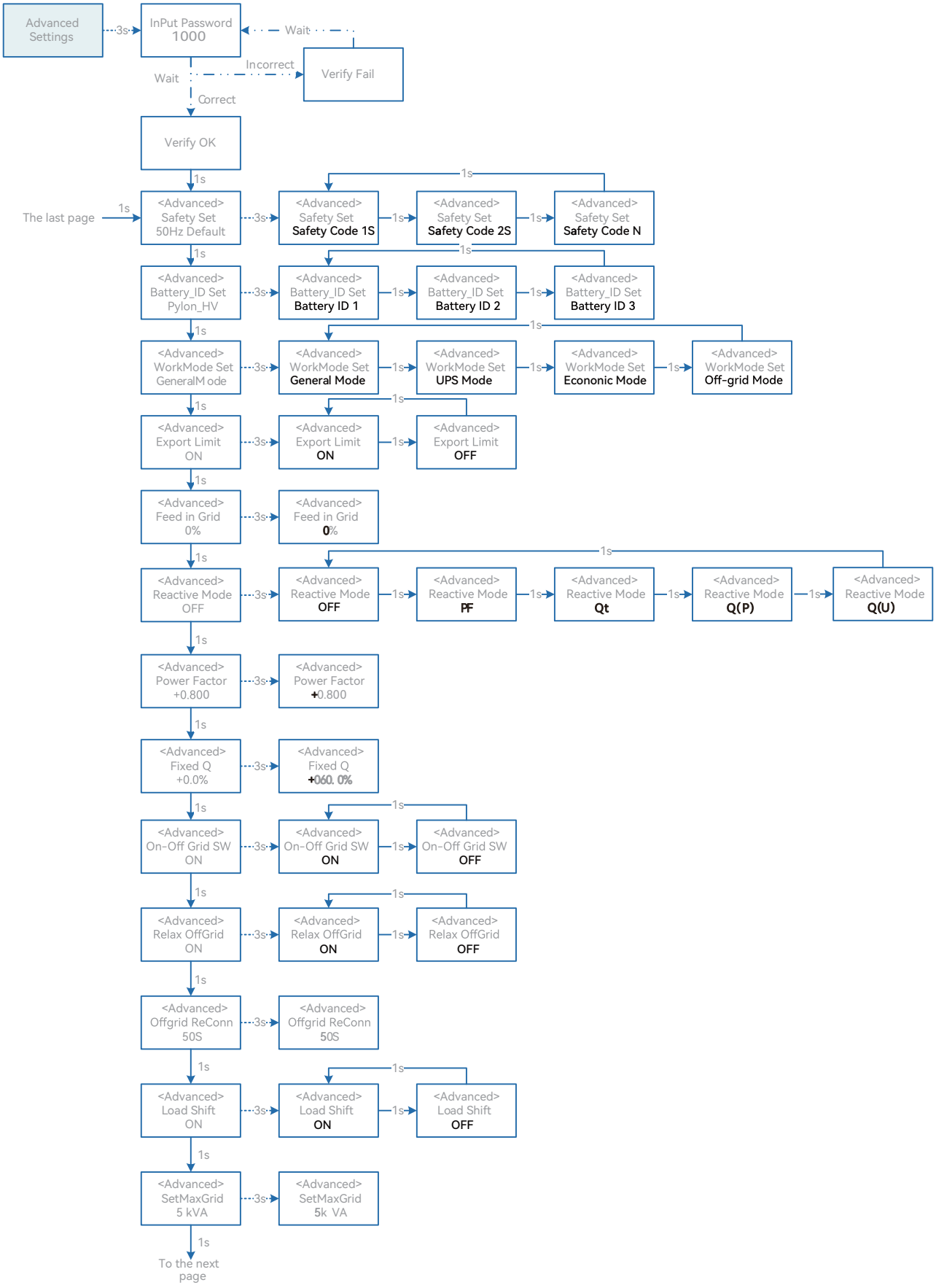
9.2 General setting

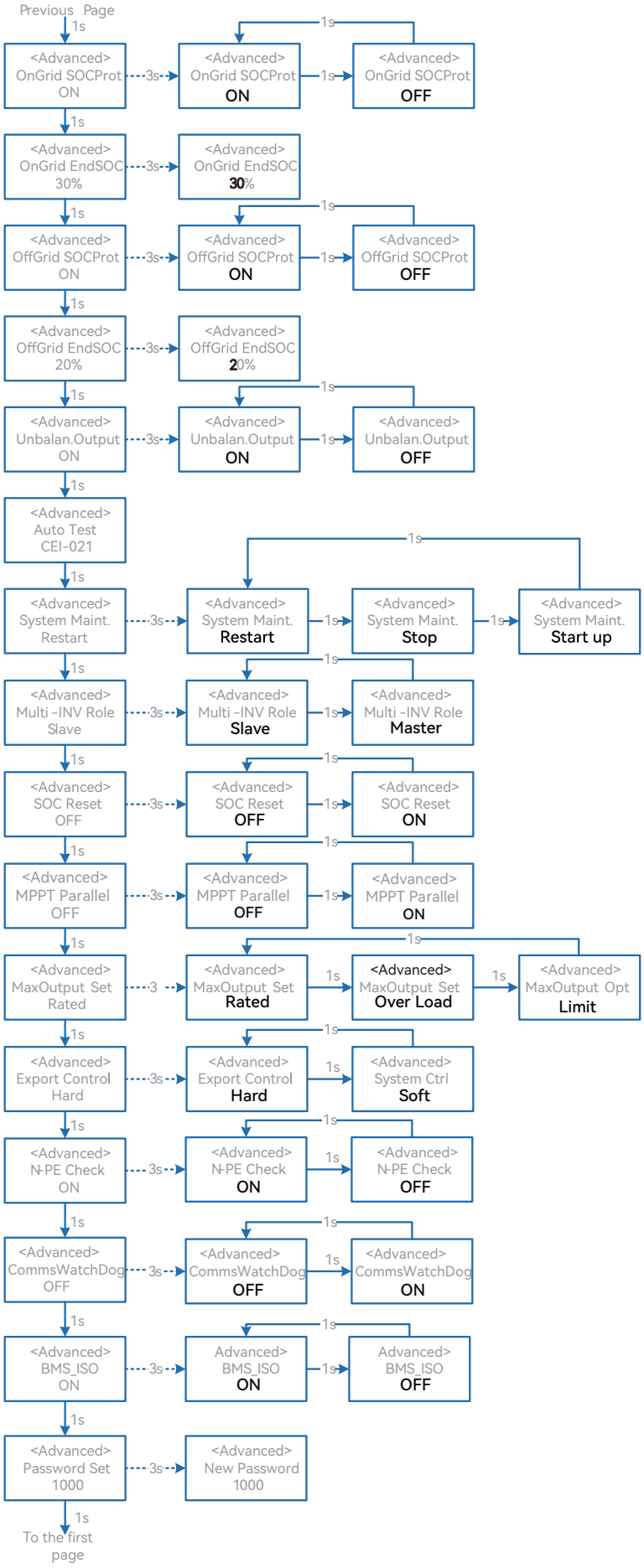


Inverter Display Abbreviation and Complete Name Reference Table

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

9.3 Advanced setting




Previous Page
1s
<Advanced> OnGrid SOCProt ON
3s
<Advanced> OnGrid SOCProt ON
1s
<Advanced> OnGrid SOCProt OFF
<Advanced> OnGrid EndSOC 30%
<Advanced> OnGrid EndSOC 30%
<Advanced> OffGrid SOCProt ON
<Advanced> OffGrid SOCProt ON
<Advanced> OffGrid SOCProt OFF
<Advanced> OffGrid EndSOC 20%
<Advanced> OffGrid EndSOC 20%
<Advanced> Unbalan.Output ON
<Advanced> Unbalan.Output ON
<Advanced> Unbalan.Output OFF
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<Advanced> System Maint. Restart
<Advanced> System Maint. Restart
<Advanced> System Maint. Stop
<Advanced> System Maint. Start up
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<Advanced> Multi -INV Role Slave
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3
<Advanced> MaxOutput Set Rated
<Advanced> MaxOutput Set Over Load
<Advanced> MaxOutput Opt Limit
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<Advanced> System Ctrl Soft
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<Advanced> CommsWatchDog OFF
<Advanced> CommsWatchDog OFF
<Advanced> CommsWatchDog ON
<Advanced> BMS_ISO ON
Advanced> BMS_ISO ON
Advanced> BMS_ISO OFF
<Advanced> Password Set 1000
<Advanced> New Password 1000
To the first page

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
Feed in Grid	Set the percentage of the power that is allowed to feed to the grid
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 %)."
Q(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.
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)
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 the power grid is off, the inverter can automatically restart the back-up output after a fault or overloading protection occurred if the Off-grid restart is ON. Otherwise, the back-up output needs to be restarted manually
Load Shifting	Peakload shifting function switch
SetMaxGrid	Set max allowed power from grid (under the condition of Peakload Shifting 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
Unbalan. Output	3-Phase Unbalanced Output Switch when inverter work on On-grid state
System Maint.	System maintenance, includes inverter stop and run, system restart
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.
SOC Reset	If turned it on, 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.

Abbreviation	Complete Name
MaxOutputSet	Select the maximum AC output power. Rated, Max. output power= Rated output power on the datasheet Overload, Max. output power= Max. output power on the datasheet Limit, 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.
CommsWatchDog	When the function is turned on, the inverter stops working when communication with the master is lost.

9.4 Country code (safety code) setting

Please set "Country code (Safety code)" under the menu "Safety Set" in " Advanced Settings ".

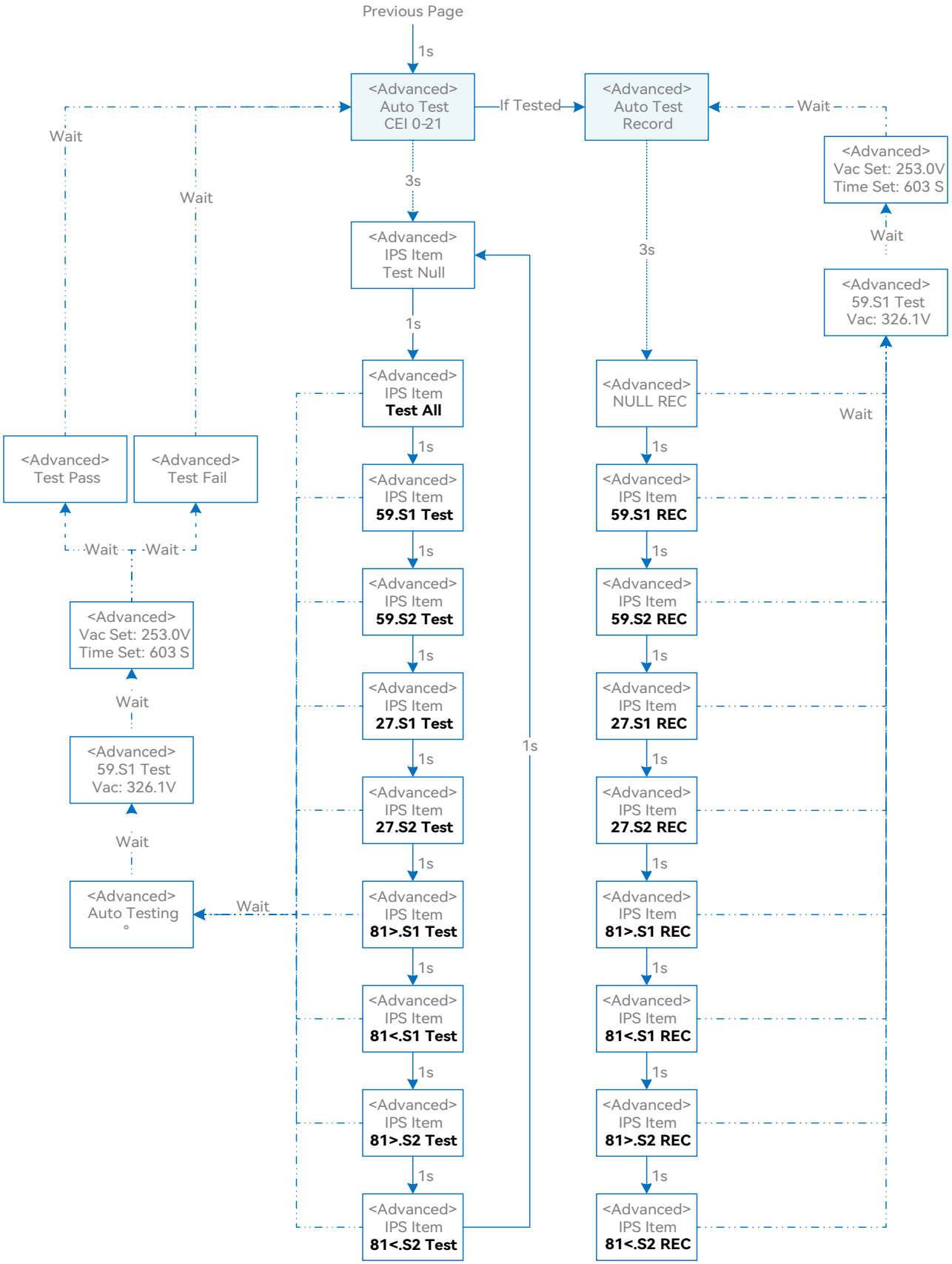
Refer to “9.3 Advanced Setting” for more information.

9.5 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 for 3 seconds to activate "Auto Test." After the autotest is finished, short press the button several times until the screen displays "Auto Test Record," and hold the button for 3 seconds to check the test results.

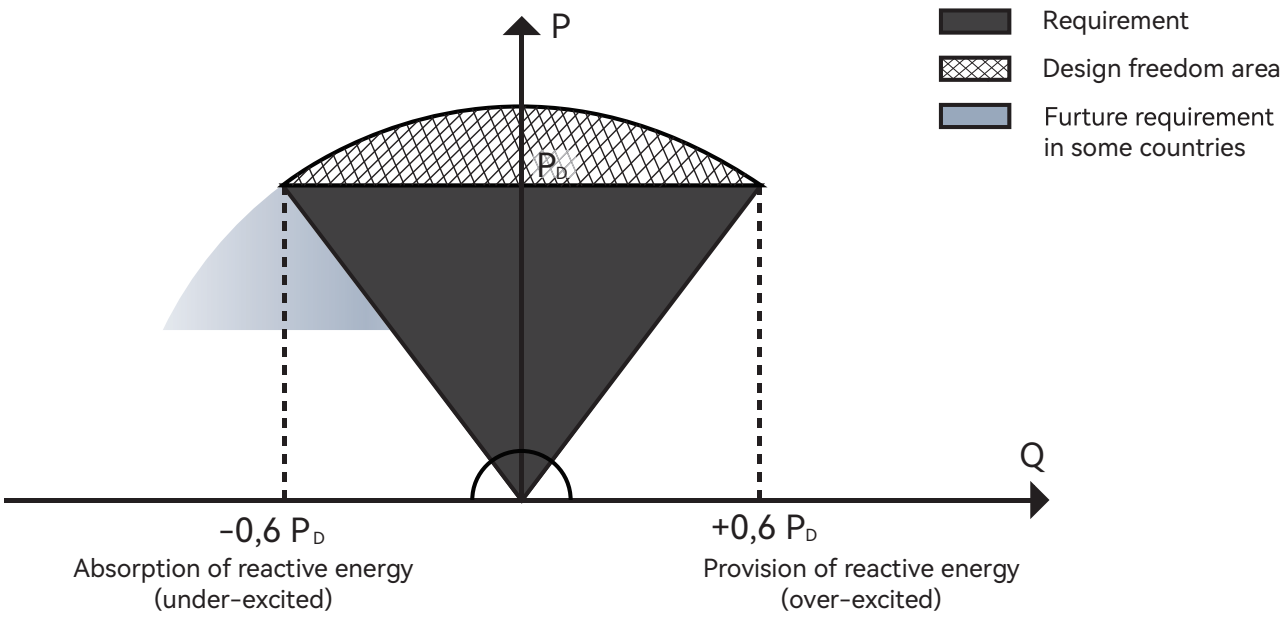
The auto test will start when the correct test item is selected, and the test result will be displayed on the screen when it is finished. If the test is successful, it will show "Test Pass." Otherwise, it will state "Test Fail." After each item is tested, the inverter will reconnect to the grid and automatically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

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



9.6 Reactive power

The inverter provides a reactive power regulation function.



This mode can be enabled via the configuration software. Some locations, such as the AU and DE markets, have it activated by default. For information on changing default setpoints, please contact Wattsonic Technical Support at service@wattsonic.com.

Descriptions of reactive power regulation modes:

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%).
Q(P)	The PF changes with the output power of the inverter.
Q(U)	The reactive power changes with the grid voltage.

9.6.1 "Off" modes

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

9.6.2 "PF" mode

The power factor is fixed, and the 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 from the grid.

Lagging: the inverter injects reactive power into the grid.

9.6.3 “Qt” mode

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

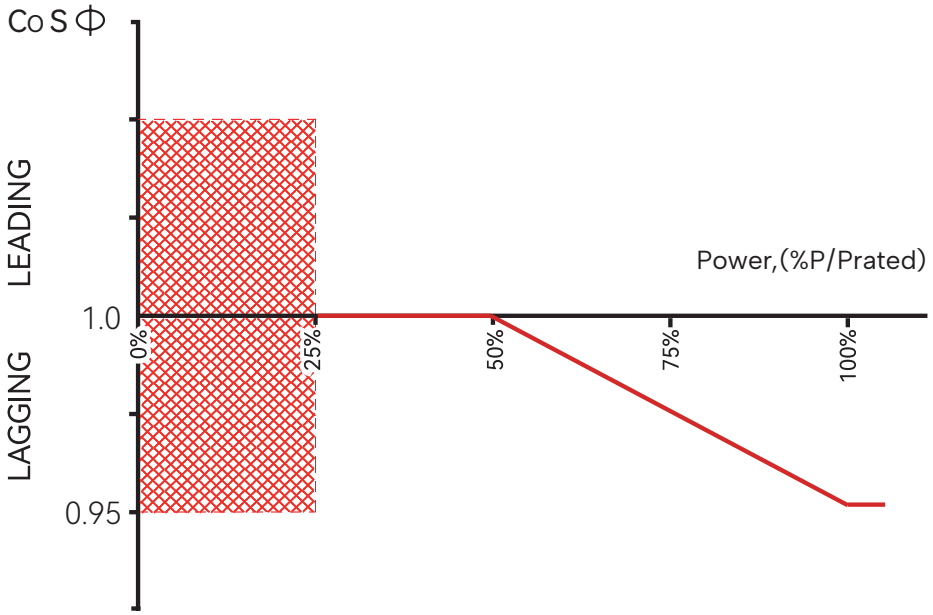
The setting range of the reactive power ratio is 0–60% or 0–60%, corresponding to the capacities of inductive and capacitive reactive power regulation, respectively.

9.6.4 “Q(P)” mode

The PF of the inverter output varies in response to the output power of the inverter.

“Q(P)” Mode Parameter Descriptions:

Parameter	Explanation	Range
QP_P1	Output power at P1 on the Q(P) mode curve (in percentage)	10% ~ 100%
QP_P2	Output power at P2 on the Q(P) mode curve (in percentage)	20% ~ 100%
QP_P3	Output power at P3 on the Q(P) mode curve (in percentage)	20% ~ 100%
QP_K1	Power factor at P1 on the Q(P) mode curve	0.8 ~1
QP_K2	Power factor at P2 on the Q(P) mode curve	
QP_K3	Power factor at P3 on the Q(P) mode curve	
QP_Enter-Voltage	Voltage percentage for Q(P) function activation	100% ~ 110%
QP_Exit-Voltage	Voltage percentage for Q(P) function deactivation	90% ~ 100%
QP_Exit-Power	Power percentage for Q(P) function deactivation	1% ~ 20%
QP_Enable-Mode	Unconditional activation/deactivation of Q(P) function	Yes / No



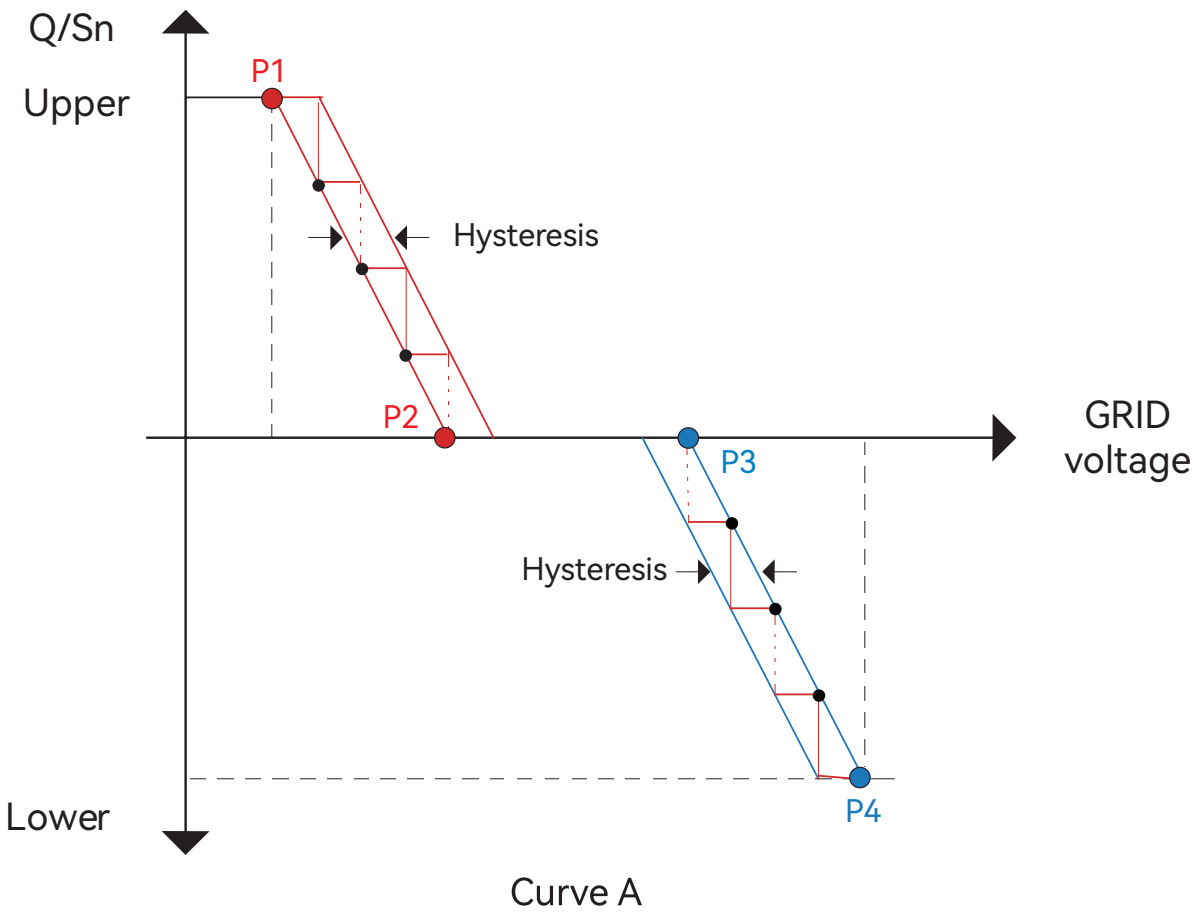
Q(P) Curve

9.6.5 “Q(U)” mode

The reactive power output of the inverter will vary in response to the grid voltage.

“Q (U)” Mode Parameter Descriptions:

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	-60% ~ 0
QU_V2	Grid voltage limit at P2 on the Q(U) mode curve	80% ~ 110%
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%



Curve A

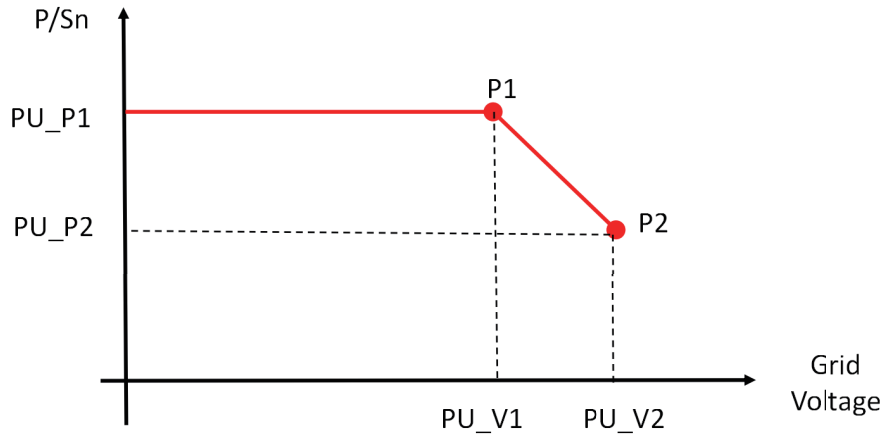
9.7 Active power

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.

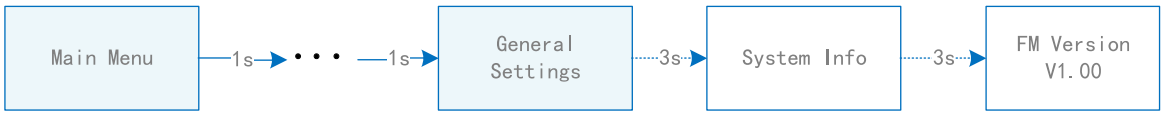
"P(U)" Mode is named "[b] Volt-watt mode" in AS/NZS 4777.2 Chapter 3.3 "Power quality response mode".

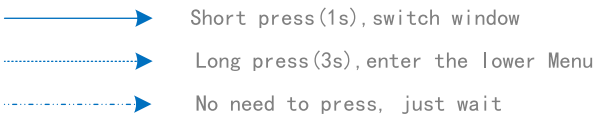
"P(U)" Mode Parameter Descriptions:

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



9.8 Check firmware version



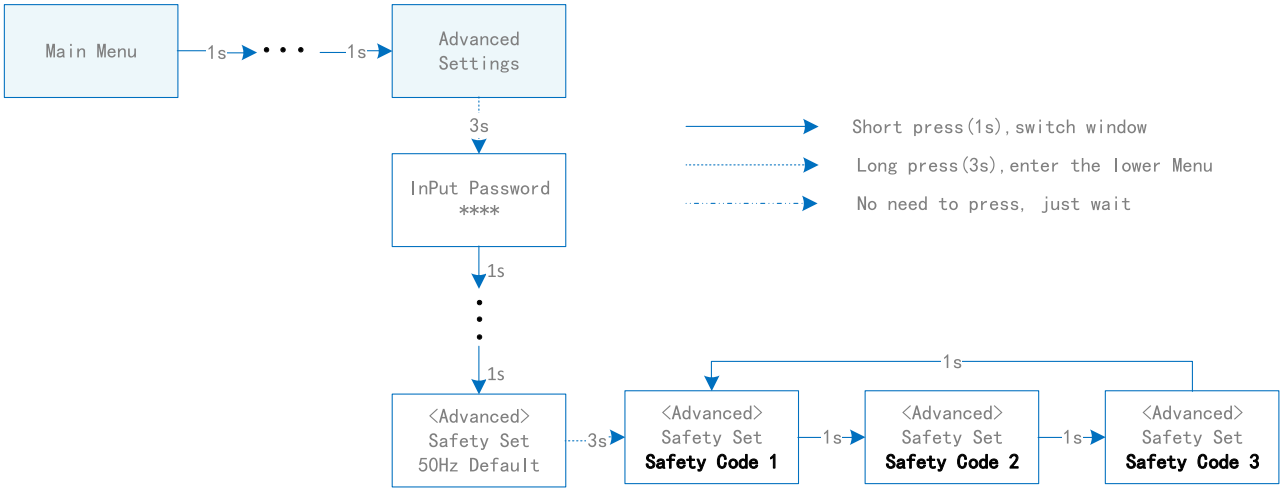


9.9 Grid parameter

9.9.1 Check grid code

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

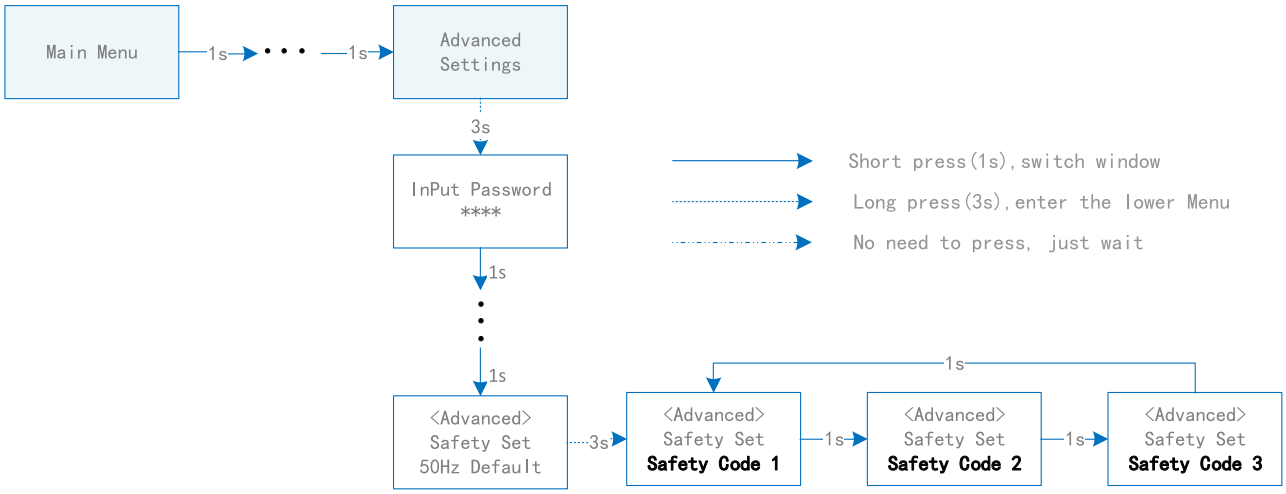
The flow chart how to select on the OLED display is following.



9.9.2 Select grid code

Inverter can select Grid Code (Region/Safety Set) for grid protection via OLED display or monitoring platform.Please enter the password to Select Grid Code. To obtain the password, please contact Wattsonic. Once Grid Code have been selected at commissioning these settings will be locked from editing (unless with Password).

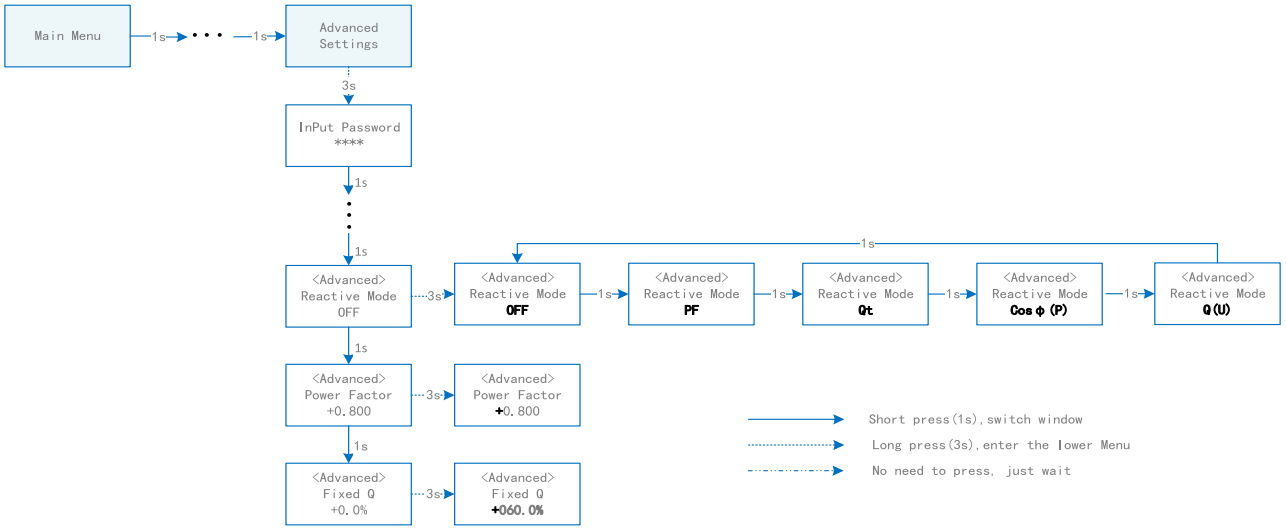
The flow chart how to check on OLED display is following.



9.9.3 Check reactive and active modes

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

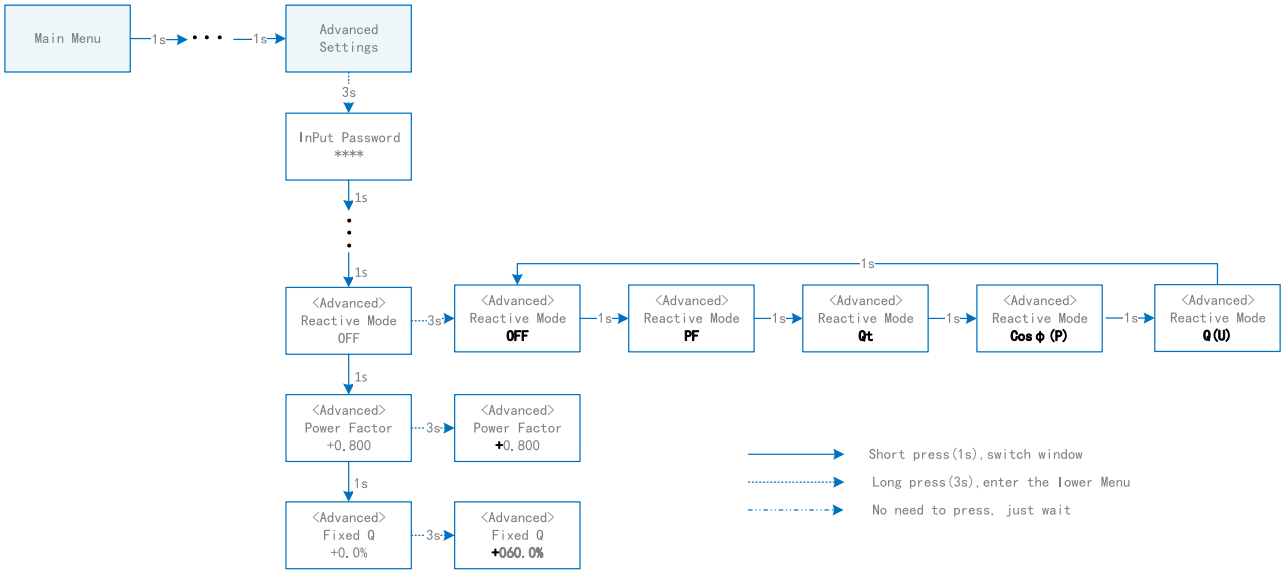
The flow chart how to check on OLED display is following.



9.9.4 Select reactive and active modes

Inverter can select Reactive and Active Modes(Power Quality Response Modes)via OLED display or monitoring platform. Please enter the password to check Reactive and Active Modes. To obtain the password, please contact Wattsonic. 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 on OLED display is following.



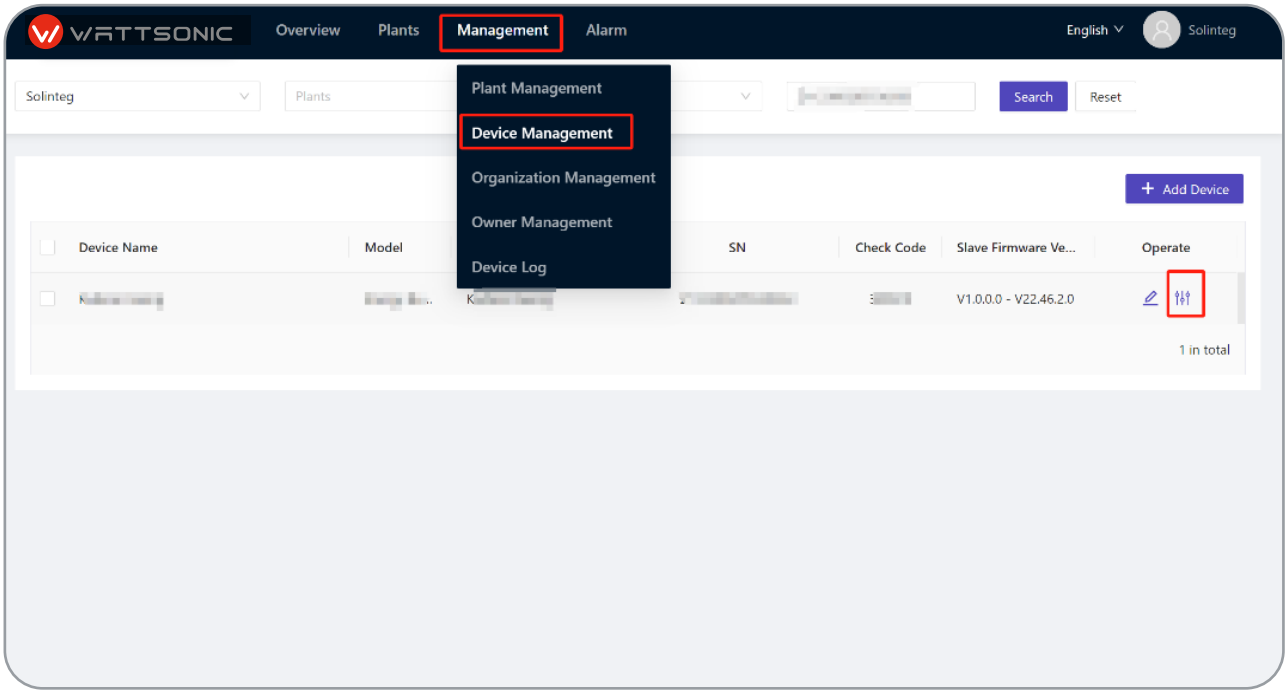
9.9.5 Set grid code, reactive and active modes setpoints

The inverter can set reactive and active modes (Power Quality Response Modes) via OLED display or monitoring platform.

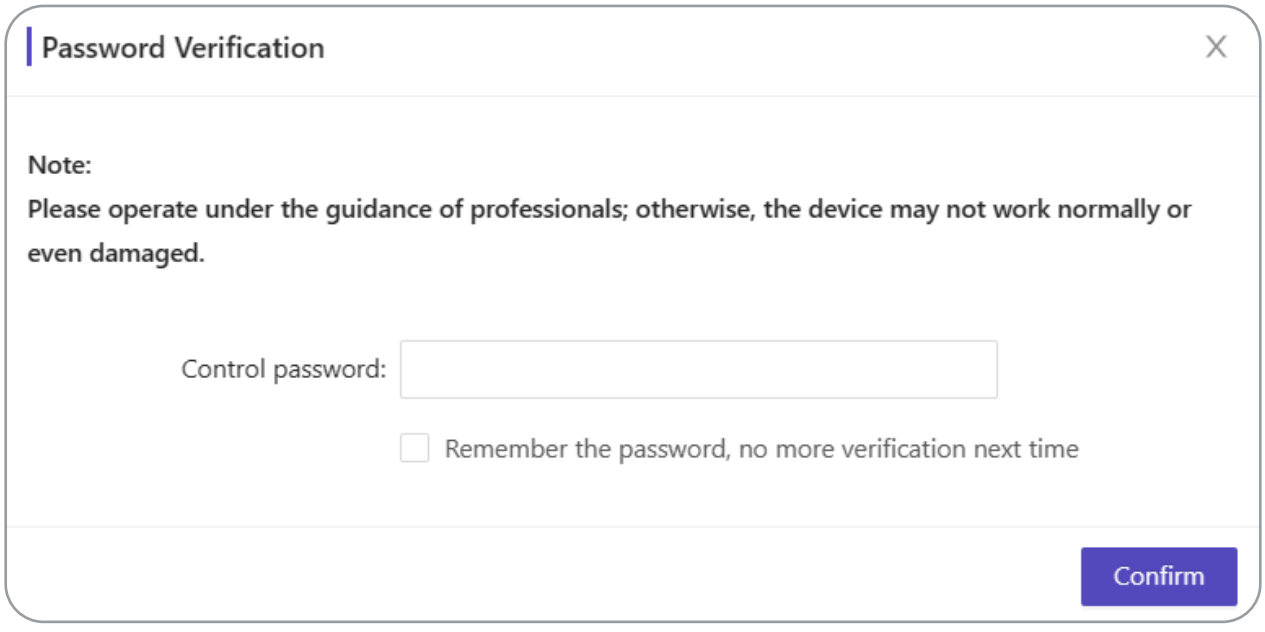
The flow chart how to set on the OLED display is following.

① On the monitoring interface, click “Device Management” in the “Management”

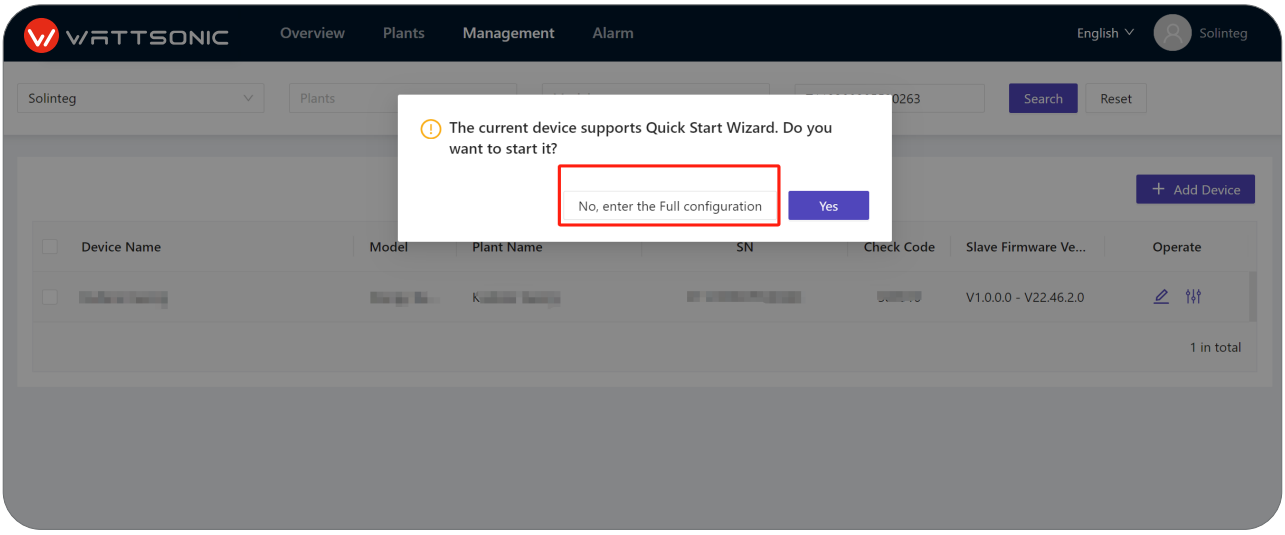
drop-down menu. Click “Parameter Settings” in “Operate” in the column of the device set.



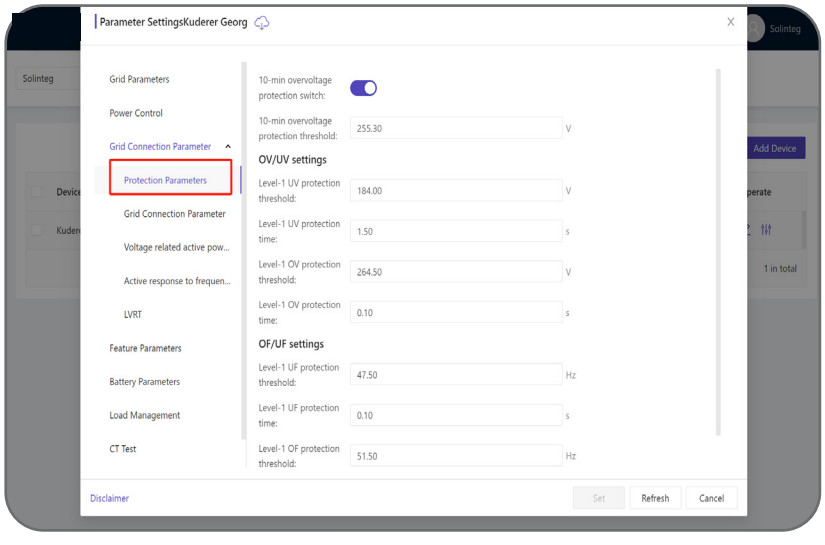
② Enter “Control password”.

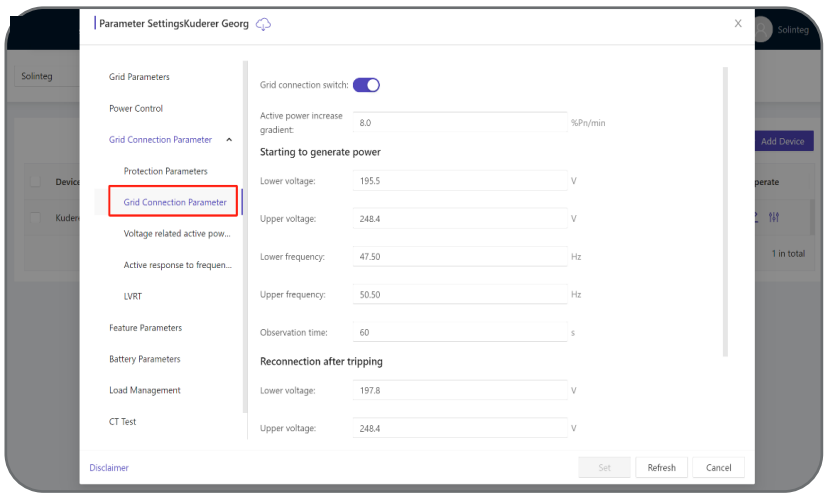


③ Click"No,enter the Full configuration".

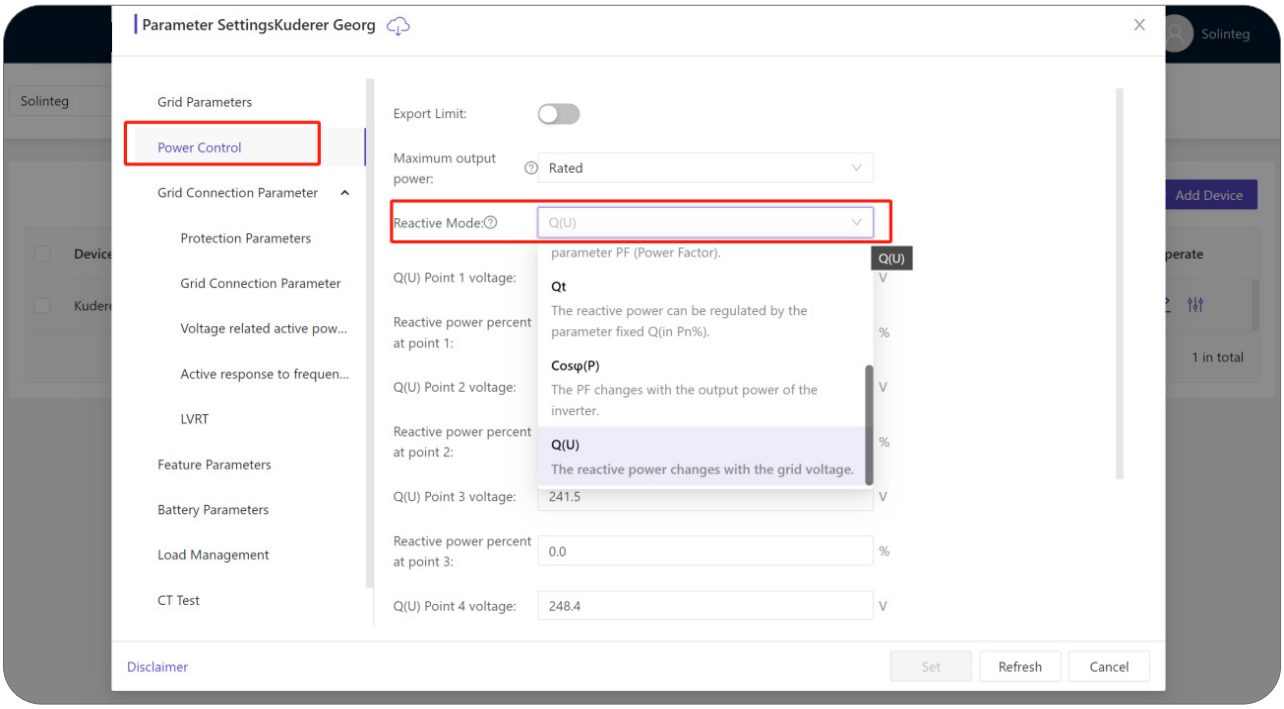


④ Enter "Protection Parameters" and "Grid Connection Parameter" menu under "Grid Connection Parameter" and adjust grid protection settings setpoints.

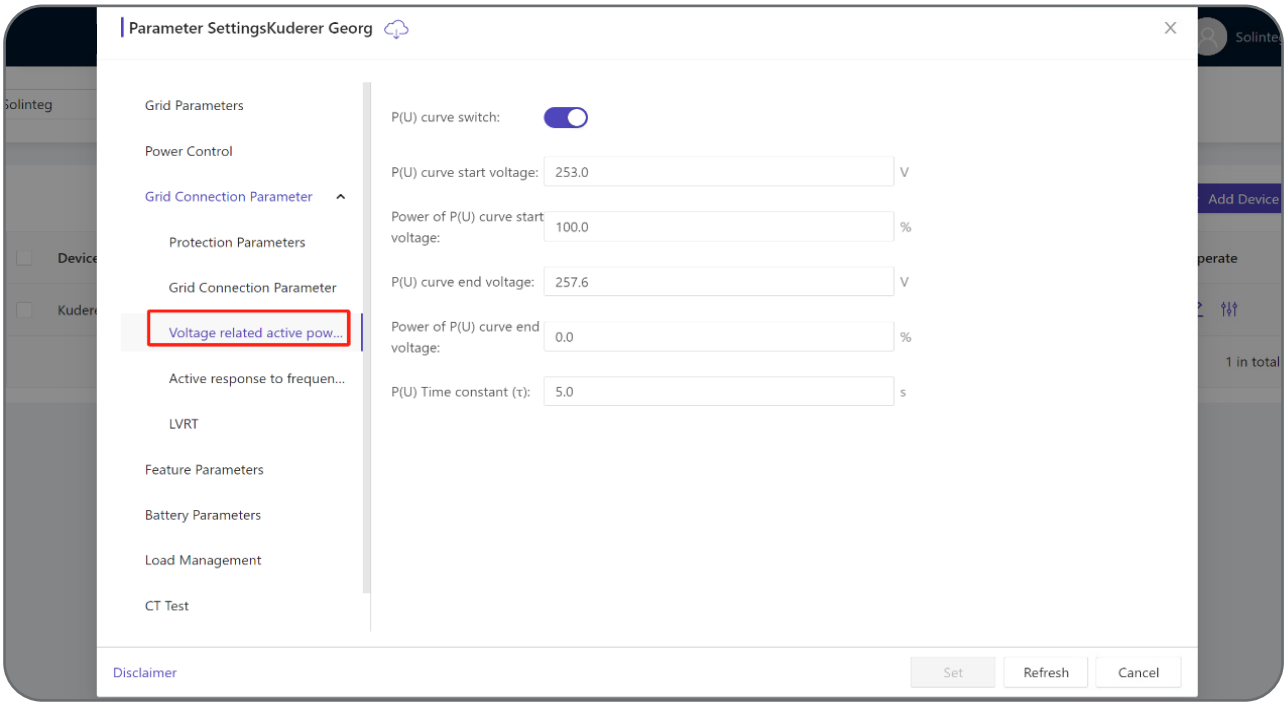




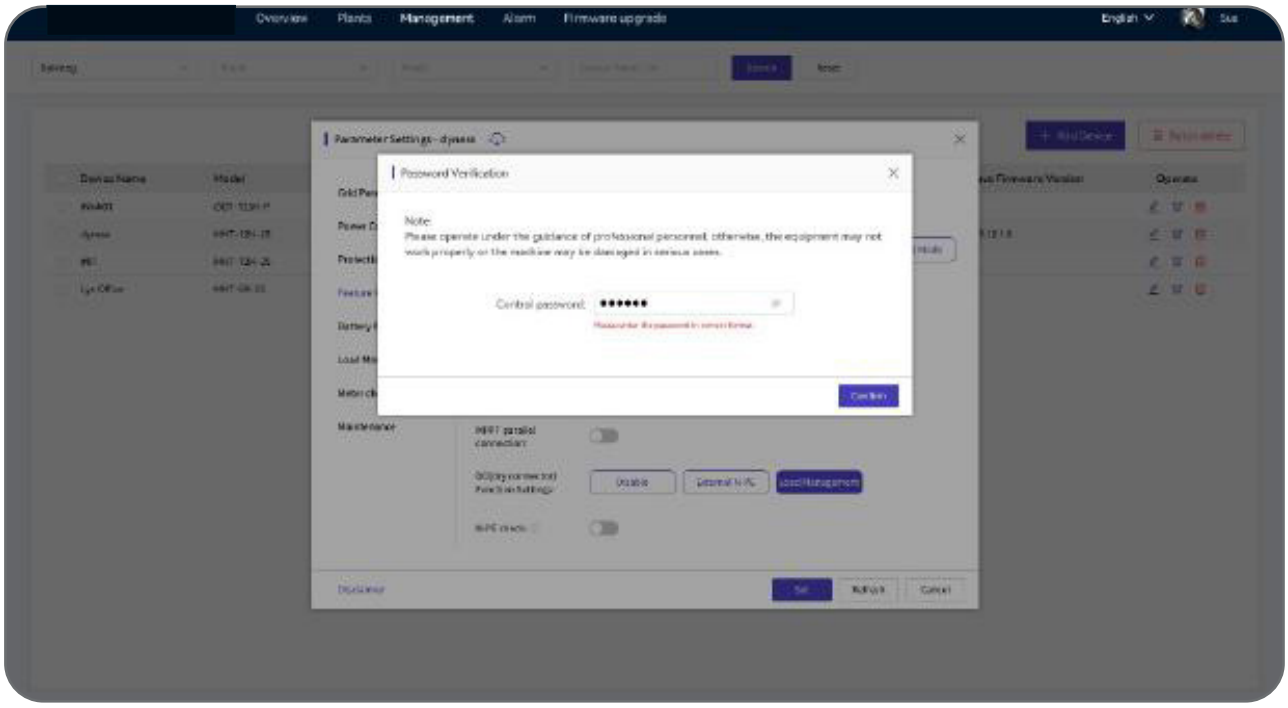
⑤ Enter “Reactive Mode” menu under “Power Control” menu and set reactive mode setpoints.



⑥ Enter “Voltage related active power P(U)” menu and set active mode setpoints.



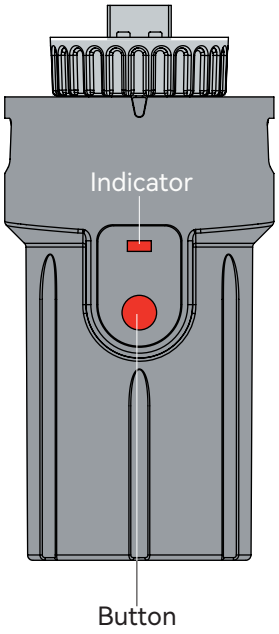
⑦ When the installer or operator need to adjust Grid Code, Protection Parameters setpoints,Grid Connection Parameter setpoints and Reactive and Active Modes setpoints, adjust these parameters setpoint and enter a password after clicking "Set".And please contact Stromherz or installer for password



Please enter the password to adjust the setpoints of Grid Code,Reactive Modes and Active Mode. To obtain the password, please contact Wattsonic. Once the setpoints of Grid Code,Reactive Modes and Active Mode have been set at commissioning these settings will be locked from editing (unless with Password).

Monitoring

10.1 Inverter monitoring device



Indicator Status	Description
Off	Connection abnormal
Always On	Communicate with the server normally
Slow flashing	The monitoring device is not connected to the router or is not connected to the base station.
Quick flashing	The monitoring device is connected to the router or connected to the base station but not connected to the server.

Button	Description
Press 1 second	Reset device, the indicator goes off for 2 seconds, then flashes normally.
Press 5 seconds	Restore factory default settings, the indicator goes off for 2 seconds, then flashes once every 2 seconds, until the factory restore is completed.

The Wi-Fi version module must be configured on the router for the first installation. If the router name or password is changed, the WiFi devices will need to be reconfigured. For details, please refer to the [QUICK USE GUIDE] attached to the accessory bag.

If DHCP is enabled on the router, the LAN version module does not need to be configured. Otherwise, please refer to the [QUICK USE GUIDE] attached to the accessory bag.

10.1.1 Cloud monitoring app

Wattsonic inverter provides a monitoring port that can collect and transmit data from the inverter to the Wattsonic monitoring platform via an external monitoring device. Please refer to the product nameplate on the side of the enclosure to get the monitoring application. If download issues exist, contact your dealer or Wattsonic technical support.

10.1.2 Local configuration app

The local configuration app is designed to quickly configure Wattsonic hybrid inverters, offering features such as safety code, battery brand and type, work modes, off-grid application settings through Wi-Fi direct connection, and so forth.

Please refer to the product nameplate on the side of the enclosure to get the application. If download issues exist, contact your dealer or Wattsonic technical support.

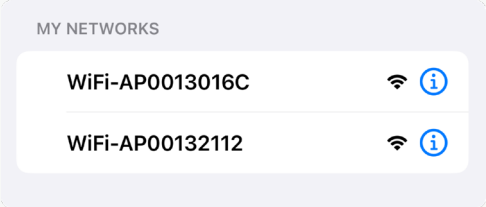
10.2 BMS Wi-Fi configuration

1

Prepare a laptop or smartphone and turn on the WLAN connection.

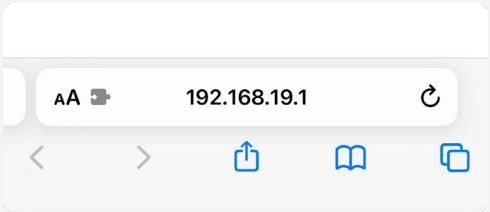
2

Click on the network's name, which is the same as the SN code of the BMS.
Enter the default password: 12345678



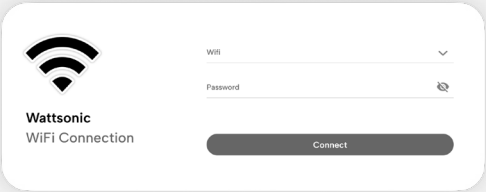
3

Choose the browser and enter 192.168.19.1



4

After entering the page, click the Wi-Fi icon to select your network's name, and enter your password to connect to the network.



5

Tap **connect** button and your device will connect to the network successfully. If your network has no password, you'll connect automatically after clicking Connect

Troubleshooting

11.1 Error message

Grid operation standards design the Wattsonic 6.0–20.0 kW-3P series hybrid inverters to conform to the requirements of safety and EMC. The inverter had passed rigorous tests to ensure it ran 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 the grid. The fault messages and their related 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 VoltageFault	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 replce with a thicker AC cable. 4. Extend the voltage protection limit with the permission of the electricity authority
Grid Fre quency Fault	Grid overvoltage or undervoltage, the grid voltage 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 gird voltage exceeds the limit of selected safety set 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 sidel, and the measured value should not be less than 500 KΩ. 3. Seek help from the installer or manufacture.

Error Message	Description	Solution
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 temperature	1.Check whether the inverter installation location is well ventilated. 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-PECheck Fault	The ground cable is losse 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 for help from the installer or manufacture.
E2 Fault	Internal storage got abnomal. Caused by a strong external magnetic field etc.	1. Restart the inverter. 2. Seek help from the installer or manufacture.
GFCI De vice Fault	GFCI device got abnormal	1. Restart the inverter. 2. Seek for help from the installer or manufacture.
AC Transducer Fault	AC transducer got abnomal	1. Restart the inverter. 2. Seek for help from the installer or manufacture.

Error Message	Description	Solution
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.
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 schedduling	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.

Error Message	Description	Solution
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 failed. Caused by a strong external magnetic field etc.	1. Restart the inverter. 2. Seek for help from the installer or manufacture.
FLASH Fault	Internal storage anomaly. Caused by a strong external magnetic field etc.	1. Restart the inverter. 2. Seek for 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. Comfirm whether the meter model is compatible
B M S 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.

11.2 Inverter maintenance

Incorrect operations do cause the risk of inverter damage or personal injury.
Please strictly follow the steps below.
1. select the 'stop' option on the inverter screen or monitoring app to shut down the inverter.
2. Turn off the AC breaker on the utility grid side.
3. Turn off the inverter DC switch.
4. Turn off the battery switch and disconnect the DC breaker on the battery side (if any).
5. Wait 10 minutes to ensure the capacitor's energy is entirely dissipated.
6. Confirm all the indicator lights are off.

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

Any Arbitrary replacement of internal components is forbidden.

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

Please remember not to do the self-maintenance before being familiar with the proper instructions for 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. Reseal the cable hole if it is aging or not sealed.	Once a year

11.3 Battery maintenance

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

Please get in touch with your battery supplier for detailed installation and maintenance information.

Do not dispose of batteries in a fire. The batteries may explode.

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

The battery has risk of electrical shock, the following scenario should be noticed during the operation.

a) Remove metal items from your body.

b) Use insulated tools.

c) Remove metal items from battery.

d) Turn off the DC breaker of the battery before assembling or disassembling battery terminals.

f) There is a risk of electrical shock if battery is unexpectedly grounded. Remove the grounding cable to avoid the electrical shock.

11.4 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.

Appendix

12.1 Master BMS& battery datasheets

MASTER BMS	SOL-BMS-3.84 GEN3
Operation Voltage [Vdc]	100~800
Max. Charge/DischargeCurrent [A]	50
Recommend Charge/Discharge Current [A]	50
Functions	Pre-charge, Over-Less Voltage/Over-Less Temperature Protection, Cells Balancing/SOC-SOH calculation etc.
Communication Protocol/Connector Type	CAN, RS485 ModBus, TCP/IP
Power Connection Type	MC4
User Interface	LCD Display(Optional, need to be confirmed upon order)
Dimension [W*H*D(mm)]	680*319*152.6
Weight	14kg
Operating Temperature [°C]	-20~55
Ingress Protection	IP21(Optional IP65, need to be confirmed upon order)
Installation Method	Stackable or Wall Mounted
Warranty	10 years

BATTERY MODULE	SOL-R24-3.84KWh GEN3
Nominal Voltage/Capacity per Module	76.8V/3.84KWH[50Ah]
Expand Capability	2~8 batteries series connection
DOD Recommended	90%
Max. Charge/Discharge Current [A]	50A Continual
Recommend Charge/Discharge Current [A]	50A Continual
Communication Protocol/Connector Type	CAN
Power Connection Type	Integrated connector
Dimension [W*H*D(mm)]	656*322*173.3 per module
Weight	38kg
Charge Temperature Range [°C]	0~45
Discharge Temperature Range[°C]	-20~55
Ingress Protection	IP21(Optional IP65, need be confirmed upon order)
Installation Method	Stackable or Wall Mounted
Cables Connection Method	Connection from side
Warranty	10 years or 10,000 cycles @90% DOD

*Battery System Configuration Options[3.84kWh]: 154V/7.68kWh,230V/11.5kWh, 307V/15.3kWh, 384V/19.2kWh, 460V/23.0kWh, 537V/26.8kWh, 614V/30.7kWh.

* Wattsonic reserves the right to modify the technical datasheet and apperance of the product in the cataloge without prior advice to the users.

12.2 Inverter datasheets

Model	6K-25-3P	8K-25-3P	10K-25-3P	12K-40-3P	15K-40-3P	20K-40-3P
PV Input						
Recommended Max. Input Power[kW]	9.00	12.00	15.00	18.00	22.50	30.00
Start-up Voltage[V]	135	135	135	135	135	135
Max. DC Input Voltage*[V]	1000*	1000*	1000*	1000*	1000*	1000*
Rated DC Input Voltage[V]	620	620	620	620	620	620
MPPT Voltage Range*[V]	120-950*	200-950*	200-950*	200-950*	200-950*	200-950*
No. of MPP Trackers	2	2	2	2	2	2
No. of DC Inputs per MPPT	1/1	1/1	1/1	2/2	2/2	2/2
Max. Input Current[A]	15/15	15/15	15/15	30/30	30/30	30/30
Max. Short-circuit Current[A]	20/20	20/20	20/20	40/40	40/40	40/40
Battery Side						
Battery Type	Lithium Battery (with BMS)					
Battery Voltage Range[V]	135-750					
Maximum Charging/Discharge Current[A]	25/25			40/40		
Grid Side						
Rated Output Power[kW]	6.00	8.00	10.00	12.00	15.00	20.00
Max. Output Apparent Power[kVA]	6.60	8.80	11.00 [1]	13.20	16.50 [3]	22.00
Max. Input Apparent Power**[kVA]	12.00	16.00	16.50	24.00	30.00	30.00
Max. Charging Power of Batter[kW]	6.00	8.00	10.00	12.00	15.00	20.00
Rated AC Voltage[V]	3L/N/PE; 220/380V;230/400V;240/415V					
Rated AC Frequency[Hz]	50/60					
Max. Output Current[A]	10.00	13.30	16.50 [2]	20.00	25.00 [4]	33.50
Power Factor	0.8 leading ...0.8 lagging					
Max. Total Harmonic Distortion	<3% @Rated output power					
DCI	<0.5%In					
Back-up Side						
Rated Output Power[kW]	6.00	8.00	10.00	12.00	15.00	20.00
Max. Output Apparent Power[kVA]	6.60	8.80	11.00	13.20	16.50	22.00
Max. Output Current[A]	10.00	13.30	16.50 [2]	20.00	25.00	33.50
On/Off-grid Switching Time[ms]	<10ms					
Rated Output Voltage[V]	3L/N/PE; 220/380V;230/400V;240/415V					
Rated Output Frequency[Hz]	50/60					
Voltage Harmonic Distortion	<3% @Linear load					
Efficiency						
Max. Efficiency	98.1%	98.2%	98.2%	98.4%	98.4%	98.4%
European Efficiency	97.3%	97.4%	97.4%	97.5%	97.5%	97.5%
Protection						
Integrated Protection	DC reverse polarity protection / Battery input reverse connection protection / Insulation resistance protection / Surge protection / Over-temperature protection / Residual current protection / Islanding protection / AC over-voltage protection / Overload protection / AC short-circuit protection					
General Data						
Over Voltage Categor	PV: II Main: III					
Dimensions [W×H×D mm]	534×418×210					
Weight [KG]	26(6-10kW)/28 (12kW) / 31 (15-20kW)					
Protection Degree	IP65					
Standby Self-Consumption [W]	<15					
Topology	Transformerless					
Operating Temperature Range [°C]	-30~60					
Relative Humidity [%]	0~100					
Operating Altitude [m]	3000 (>3000m Derating)					
Cooling	Natural Convection				Smart fan	
Noise Level [dB]	<25				<40	
Display	OLED & LED					
Communication	CAN, RS485, WiFi/LAN (Optional)					

* PV Max. Input voltage is 950V without battery, or 850V with battery, otherwise inverter will be waiting;

** Max apparent power from the grid means the maximum power imported from the utility grid used to satisfy the backup loads and charge the battery;

***Wattsonic reserves the right to modify the technical datasheet and apperance of the product in the user manual without prior advice to the users.

1) G98: 10.5kVA; 2) G98: 16.00A 3) AS 4777.2: 15.0kVA; 4) AS 4777.2: 21.7A

12.3 Contact Information

If you have any questions about this product, please get in touch with us.

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

- Model of the device
- Serial number of the device
- Date of the device
- Fault code or name
- A brief description of the problem

China (HQ)

Wuxi Wattsonic Energy Technology Co., Ltd

Address: Floor 4 Building H1 NO.6 Jingxian Road, Xinwu District, Wuxi 214135, China

Website: www.wattsonic.com

Service Mail: service@wattsonic.com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