User Manual

Hybrid Solar Inverter
User Manual

Product Model:CJ-3~6KSL1

Contents

1. Introduction

1.1 Important Safety Instructions

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

⚠ **Caution!**
• Danger of burn injuries due to hot enclosure parts!
• During operation, the upper lid of the enclosure and the enclosure body may become hot.
• Only touch the lower enclosure lid during operation.
• Avoid staying closer than 20 cm to the inverter for extended periods due to possible health risks from radiation.

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

⚠ **Warning!**
• Ensure the input DC voltage is ≤ the maximum DC voltage rating. Overvoltage may cause permanent damage to the inverter or other losses, which are not covered under warranty.
• Authorized service personnel must disconnect both AC and DC power from inverter before attempting any maintenance or cleaning or working on any circuits connected to inverter.
• Risk of electric shock!

- Use accessories that come with the inverter shipment only; using other accessories may pose risks of fire, electric shock, or personal injury.
- Make sure that existing wiring is in good condition and that wire is not undersized.
- Do not disassemble any parts of inverter which are not mentioned in installation guide. It contains no user-serviceable parts. See Warranty for instructions on obtaining service. Attempting to service the inverter yourself may result in a risk of electric shock or fire and will void your warranty.
- Keep away from flammable, explosive materials to avoid fire disaster.
- The installation place should be away from humid or corrosive substance.
- Authorized service personnel must use insulated tools when installing or working with this equipment.
- PV modules must have an IEC 61730 Class A rating.
- Never touch either the positive or negative pole of PV connecting device. Strictly prohibit touching both of them at the same time.

- The unit contains capacitors that remain charged to a potentially lethal voltage after the MAINS, battery and PV supply has been disconnected.
- Hazardous voltage will present for up to 5 minutes after disconnection from power supply.
- CAUTION-RISK of electric shock from energy stored in capacitor, Never operate on the inverter couplers, the MAINS cables, Battery cables, PV cables or the PV generator when power is applied. After switching off the PV, battery and Mains, always wait for 5minutes to let the intermediate circuit capacitors discharge before unplugging DC, battery inplug and MAINS couplers.
- When accessing the internal circuit of inverter, it is very important to wait 5 minutes before operating the power circuit or demounting the electrolyte capacitors inside the device. Do not open the device until the capacitors have had sufficient time to discharge!

1.2 Explanation of Symbol

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

Symbols on the Type Label

Symbol	Explanation
CE	CE mark. The inverter complies with the requirements of the applicable CE guidelines.
Connect Direct (ena)	UK G99 certified
TUV SUD	TUV certified.
RCM	RCM remark.
(hot surface)	Beware of hot surface. The inverter can become hot during operation. Avoid contactduring operation.
(high voltage)	Danger of high voltages. Danger to life due to high voltages in the inverter!
(danger)	Danger. Risk of electric shock!
(documentation)	Observe enclosed documentation.
(waste bin)	The inverter can not be disposed together with the household waste. Disposal information can be found in the enclosed documentation.
(do not operate)	Do not operate this inverter until it is isolated from battery,mains and on-site PV generation suppliers.
(5min)	Danger to life due to high voltage. There is residual voltage existing in the inverter after poweroff,which needs 5 min to discharge. Wait 5 min before you open the upper lid or the DC lid.

1.3 Basic features

- Hybrid Inverter series is a high quality inverter which can convert solar energy to AC energy and store energy into battery.
- The inverter can be used to optimize self consumption, store in the battery for future use or feeding to public grid. Work mode depends on PV energy and user's preference. It can provide power for emergency use during the grid lost by using the energy from battery and inverter (generated from PV).In addition, the parallel function is available(off-grid mode).

System Diagram 1 (applies to most countries)

SPDT: Single-pole, double-throw switch, For bypass maintenanceFor, Purchased by the user himself.
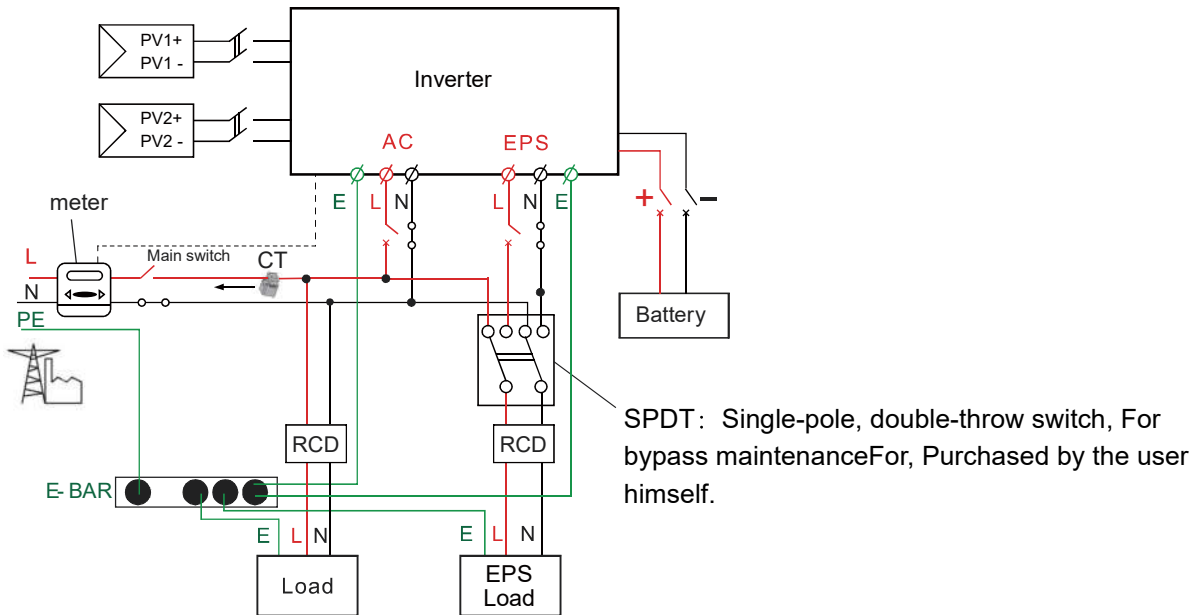
System Diagram 2 (applies to wiring rules AS/NZS_3000:2012 for Australia and New Zealand)
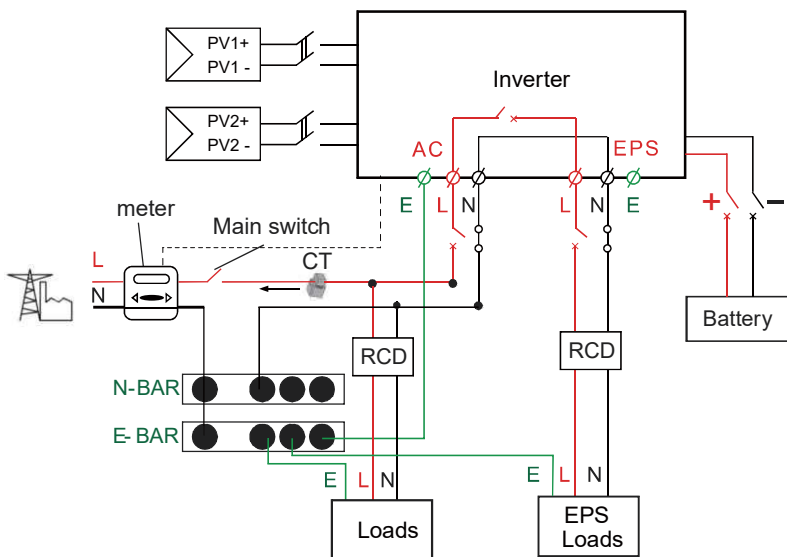
Note!
The instrument and switch in the above figure are provided by users.

1.4 Work Modes

- Hybrid Inverter provides multiple work modes based on different requirements.

Work modes: Self-use

1.When PV, Grid, Battery is available:
A. Solar energy provides power to the loads as first priority, if solar energy is sufficient to power all connected loads, solar energy excess power will provides to charge battery, and then redundant power will feed to grid.

B. Solar energy provides power to the loads as first priority ,if solar energy is not sufficient to power all connected loads, battery energy will supply power to the loads at the same time.

C. Solar energy provides power to the loads as first priority ,if solar energy and battery are not sufficient to power all connected loads, utility energy (Main Grid) will supply power to the loads at the same time.

2 .When PV, Grid is available（without battery）:
A. Solar energy provides power to the loads as first priority ,if solar energy is sufficient, the excess power will feed to grid.

B. Solar energy provides power to the loads as first priority, if solar energy is not sufficient to power all connected loads, Grid energy will supply power to the loads at the same time.

3 .When PV, Battery is available（Grid is disconnected）:
A. Solar energy provides power to the loads as first priority ,if solar energy is sufficient to power all connected loads, solar energy will provides to charge battery.

B. Solar energy provides power to the loads as first priority ,if solar energy is not sufficient to power all connected loads, battery energy and solar energy will supply power to the loads at the same time.

Work modes: Peak shift

1.When PV, Grid, Battery is available:
A. During charging, solar energy will charge the battery as a priority. The excess energy will supply power to the loads.If solar energy is sufficient to supply loads and charge battery,and If there's still some extra energy, then the excess power will feed the power to grid.

B. On charge time, solar energy will charge battery as first priority.then the excess solar energy will supply power to loads.If solar energy is not sufficient to charge battery and supply loads, grid will supply all the connected loads with solar energy together.
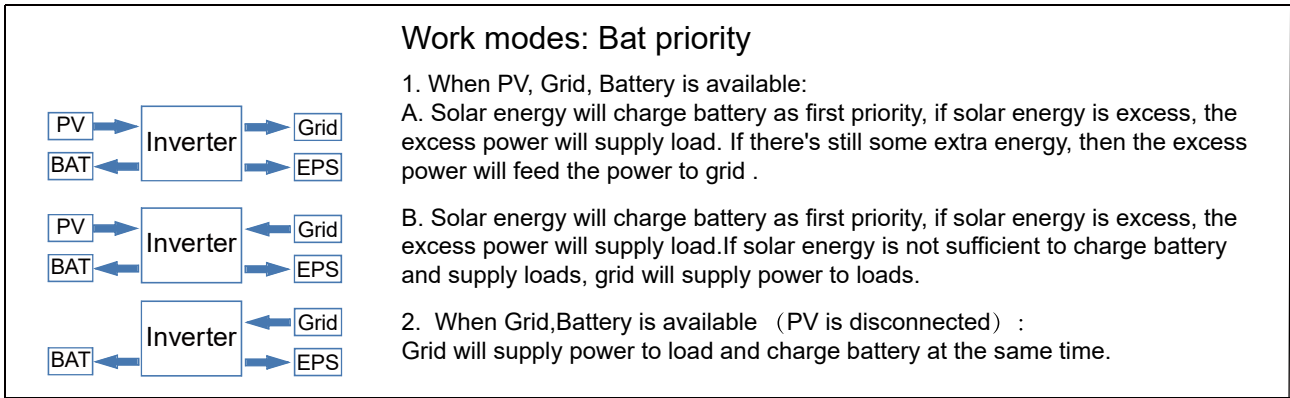
C. On discharge time, solar energy provides power to the loads as first priority, if solar energy is sufficient to supply loads ,and if there's still some extra energy from solar energy ,then the excess power and battery will deliver the power to the grid at the same time.

D. In the period of no charge or discharge, the solar power supply loads at first priority , excess energy to the grid.

2. When Grid, Battery is available(PV is disconnected):
A. On charge time, grid will charge battery and supply power to the connected loads at the same time.

B. On discharge time, if load power is less than battery power, battery will supply power to loads as first priority, the excess power will be feed to grid.

C. On discharge time, if load power is more than battery power, battery and grid will supply power to the loads at the same time.

Work modes: Bat priority

| PV | Inverter | Grid |
| BAT | | EPS |

1. When PV, Grid, Battery is available:
A. Solar energy will charge battery as first priority, if solar energy is excess, the excess power will supply load. If there's still some extra energy, then the excess power will feed the power to grid .

B. Solar energy will charge battery as first priority, if solar energy is excess, the excess power will supply load.If solar energy is not sufficient to charge battery and supply loads, grid will supply power to loads.

2. When Grid,Battery is available （PV is disconnected）:
Grid will supply power to load and charge battery at the same time.

Note: If set anti-Reverse function allowable, Once on the work mode of Self-use, Peak shift, battery priority, the system will not feed power to grid.

1.5 Dimension

550mm — 200mm

Wait   Normal   Alarm   Fault

520mm
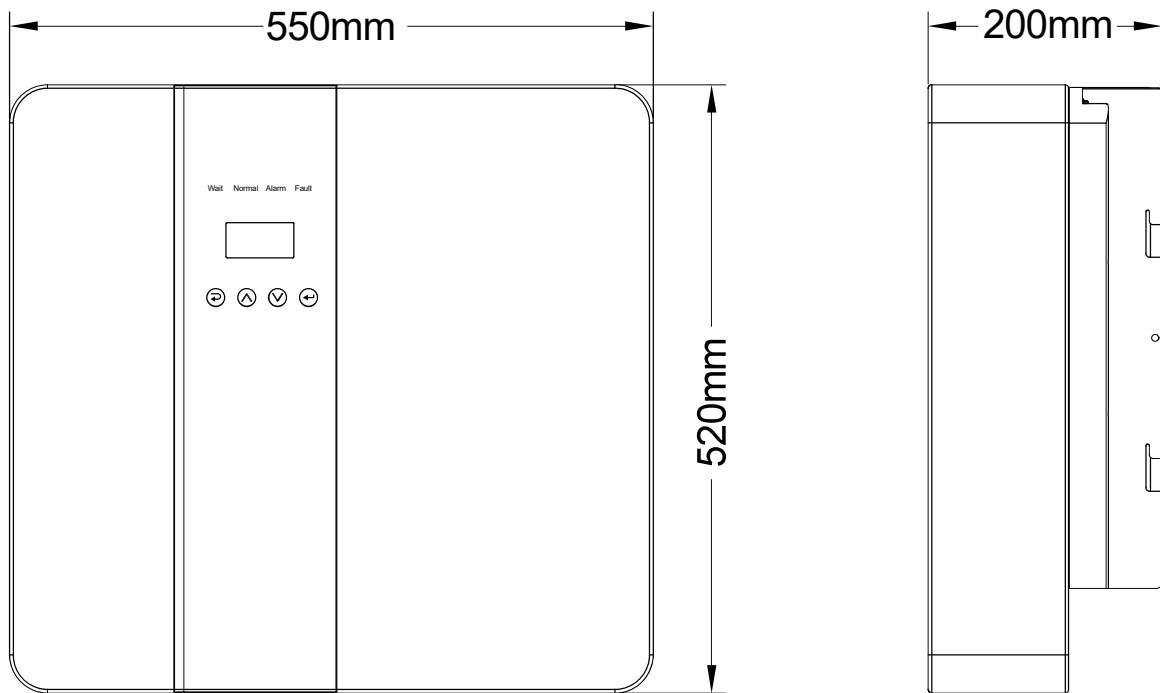
2. Interface definition and Technical Data

2.1 Interface definition
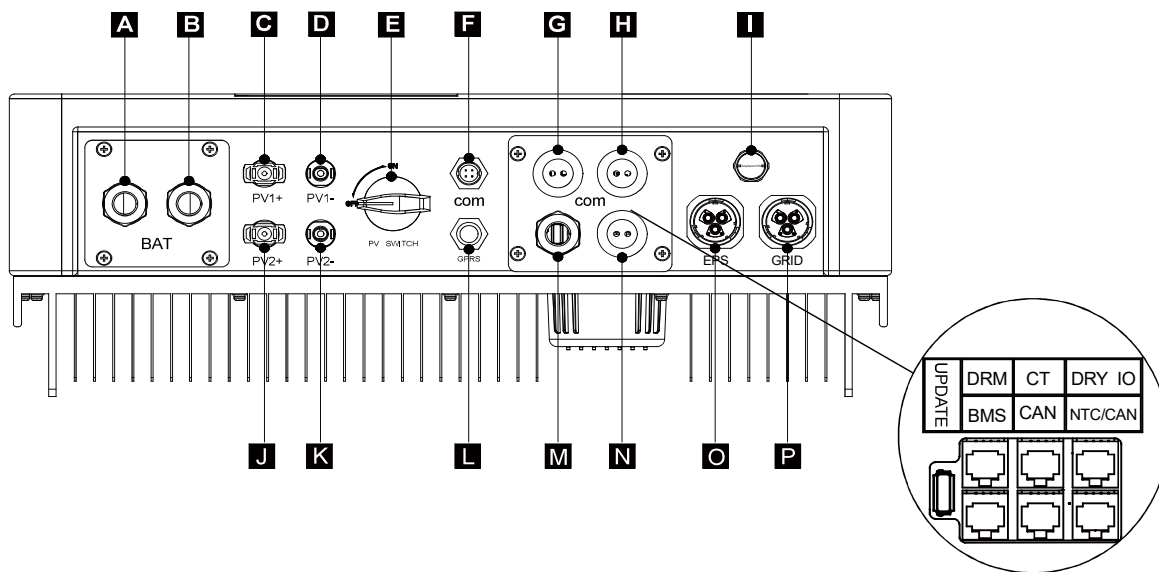
Object	Description
A/B	Battery +/Battery -
C/D	PV1+/PV1-
J/K	PV2+/PV2-
E	DC switch
F	WiFi port for external WiFi
L	Reserved port
G	DRM/BMS

Object	Description
H	Grid current / DRY IO
M	USB port for upgrading
N	POWER CAN /LEAD-NTC
I	Pressure valve
O	EPS output
P	Grid output

Note:
1. The Update port: For on-premises upgrades.
2. The BMS port: BMS communication for lithium batteries.
3. The CT port: For external grid side CT to detect current size.
4. The DRM port: Demand response modes,Only used in some countries.
5. CAN port: Parallel port.
6. NTC/CAN port: The reserved port can be used as a parallel port.
7. DRY IO port: Reserved port.

2.2 Technical Data

Model	CJ-3KSL1	CJ-3K6SL1	CJ-4KSL1	CJ-4K6SL1	CJ-5KSL1	CJ-6KSL1
DC input						
Max. recommended DC power [W]	4600	4600	6000	6000	7000	7000
Max. DC voltage[V]			550			
Nominal DC operating voltage[V]			360			
MPPT voltage range [V]	125-500	125-500	125-500	125-500	125-500	125-500
MPPT voltage range@full load [V]	150-500	150-500	170-500	170-500	220-500	220-500
Max. input current [A]			14/14			
Max. short circuit current [A]			17.5/17.5			
Start input voltage [V]			125			
No. of MPP trackers			2			
Strings per MPP tracker			1			
DC disconnection switch			/			
AC output						
Nominal AC power[VA]	3000	3680	4000	4600	5000	6000
Max. apparent AC power[VA]	3000	3680	4000	4600	5000	6000
Rated grid voltage(range)[V]			230(176 to 270)			
Rated grid frequency[Hz]			50/60			
Nominal AC current[A]	13	16	17.4	20	21.7	26
Max.AC current[A]	13	16	17.4	20	21.7	26
Displacement power factor			0.9 leading~0.9 lagging			
Total harmonic distortion(THDI)			< 3%			
Load control			optional			
AC input						
Nominal AC power[VA]	3000	3680	4000	4600	5000	6000
Rated grid voltage(range)[V]			230(176 to 270)			
Rated grid frequency[Hz]			50/60			
Nominal AC current[A]	13	16	17.4	20	21.7	26
Max.AC current[A]	13	16	17.4	20	21.7	26
Displacement power factor			0.9 leading~0.9 lagging			
AC inrush current			35			
EPS output						
EPS rated power[VA]	3000	3680	4000	4600	5000	6000
Max. EPS power[VA]	3000	3680	4000	4600	5000	6000
EPS rated voltage, Frequency			230VAC, 50/60Hz			
EPS rated current[A]	13	16	17.4	20	21.7	26
Max. EPS current[A]	13	16	17.4	20	21.7	26
Switch time[s]			<10ms			
Total harmonic distortion(THDv)			<2%			
Parallel operation			Yes			
Compatible with the generator			Yes(signal provided only)			
Battery parameter						
Battery type			Lithium battery/Lead-ACID			
Battery voltage range[V]			40-58			
Recommended battery voltage[V]			48			
Cut Off Voltage[V]			40			
Max. charging Voltage[V]			58			
Max. Protective Voltage[V]			59			
Max. charge/discharge current[A]	95/62.5	95/76.6	95/83.3	95/95.8	95/104.2	95/110
Peak charge/discharge current[A]	95/62.5	95/76.6	95/83.3	95/95.8	95/104.2	95/110
Communication interfaces			CAN/RS485/WIfI/LAN/DRM			
Reverse connect protection			Yes			
Efficiency						
MPPT efficiency			99.9%			
Euro efficiency			97%			
Max. efficiency			97.6%			
Max. Battery charge efficiency			95%			
Max. Battery discharge efficiency			95%			

Note: If the South African national grid standard is selected, the grid power is only 4.6kW!

2.3 Basic Data

Model	CJ-3KSL1	CJ-3K6SL1	CJ-4KSL1	CJ-4K6SL1	CJ-5KSL1	CJ-6KSL1
Dimension [W/H/D](mm)	550*520*200					
Dimension of packing [W/D/H](mm)	680*660*330					
Net weight [kg]	25					
Gross weight [kg]	31					
Installation	modularization					
Operating temperature range[℃]	-25~+60 (derating at 45)					
Storage temperature [℃]	-25~+60					
Storage/Operation relative humidity	0%~95% (Condensing)					
Altitude [m]	<2000					
Ingress Protection	IP65(for outdoor use)					
Protective Class	I					
Night-time consumption	15-25W					
Over Voltage Category	III (MAINS),II(PV,Battery)					
Pollution Degree	II					
cooling	Natural					
Noise level	<40dB					
Inverter Topology	non-isolated					
Active anti-islanding method	Power variation					
Communication interface	CAN/RS485/WIfI/LAN/DRM					

2.4 Safety and Protection

Safety & Protection	
Over/under voltage protection	YES
DC isolation protection	YES
Monitoring ground fault protection	YES
Grid protection	YES
DC injection monitoring	YES
Back feed current monitoring	YES
Residual current detection	YES
Anti-islanding protection	YES
Over load protection	YES
Over heat protection	YES
Max. output fault current	55A
Max. output over current	28.7A

3. Installation

3.1 Check for Physical Damage

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

3.2 Packing List

- Open the package and take out the product, please check the accessories first.
- The packing list shown as below.
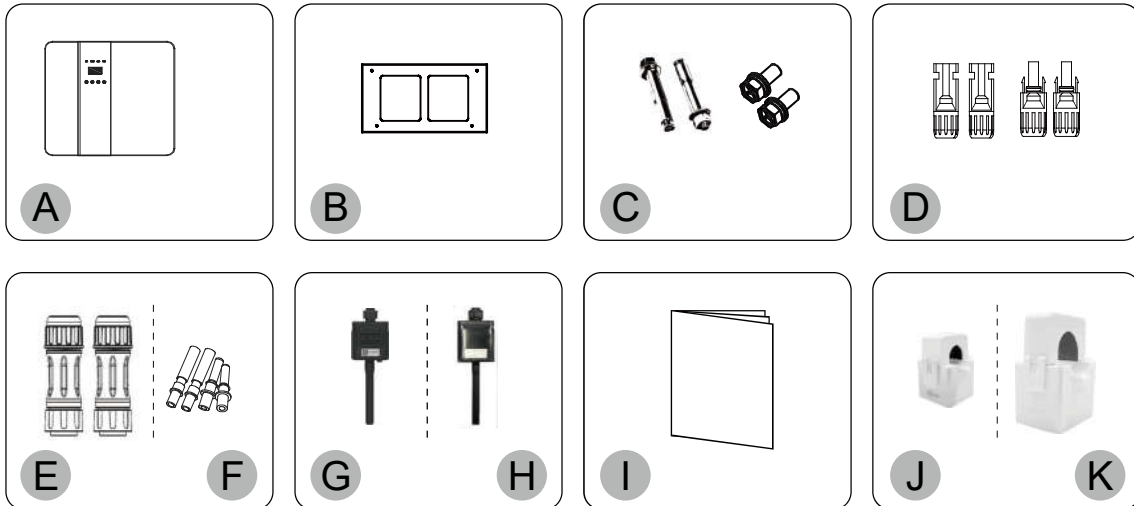
Object	Description	Object	Description
A	Inverter	G	Wifi module (optional)
B	Bracket	H	GPRS module (optional)
C	Expansion screws and pan-head screws	I	User manual
D	PV connectors (2*positive, 2*negative)	G	CT (maximum range is 90A)
E	AC terminals	K	CT (optional,maximum range is 200A. Use to Parallel System Diagram 2.)
F	PV pin connectors (2*positive, 2*negative)		

3.3 Tools required for installation.

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

3.4 Mounting

● Space Requirement

300mm
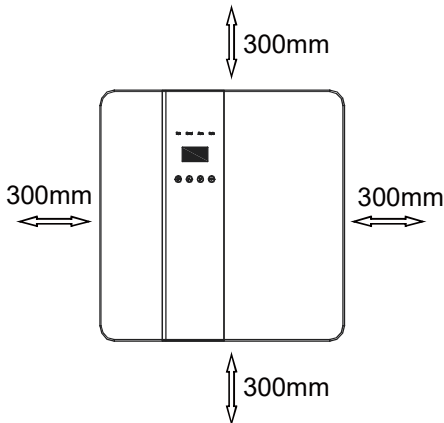
300mm   300mm

300mm

Table Available Space Size

Position	Min.size
Left	300mm
Right	300mm
Top	300mm
Bottom	300mm
Front	300mm

Step 1: Screw the wall bracket on the wall

    1.1 Place the bracket on the wall and mark down the position of the 4 holes.

    1.2 Drill holes with driller, make sure the holes are deep enough (at least 60mm) to support the inverter.

    1.3 Install the expansion tubes in the holes, and tighten them. Then install the wall bracket with the expansion screws.

420mm

220mm

380mm
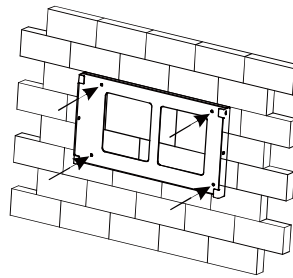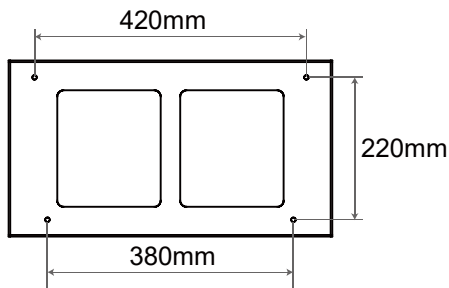
Step 2: Place the inverter on the wall mounted bracket by holding the handle on the side.
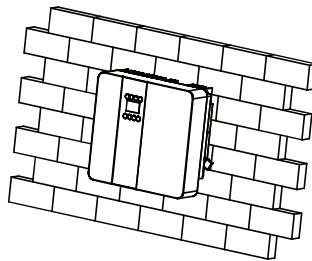
Step 3: Tighten the fixing screws on both sides of the inverter.

Step 4: If necessary, customer can install an anti-theft lock on the left-bottom of the inverter.
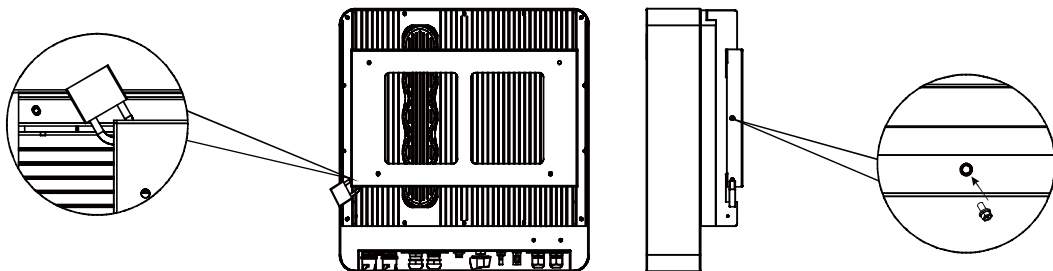
4. Electrical Connection

● Electrical connection diagram
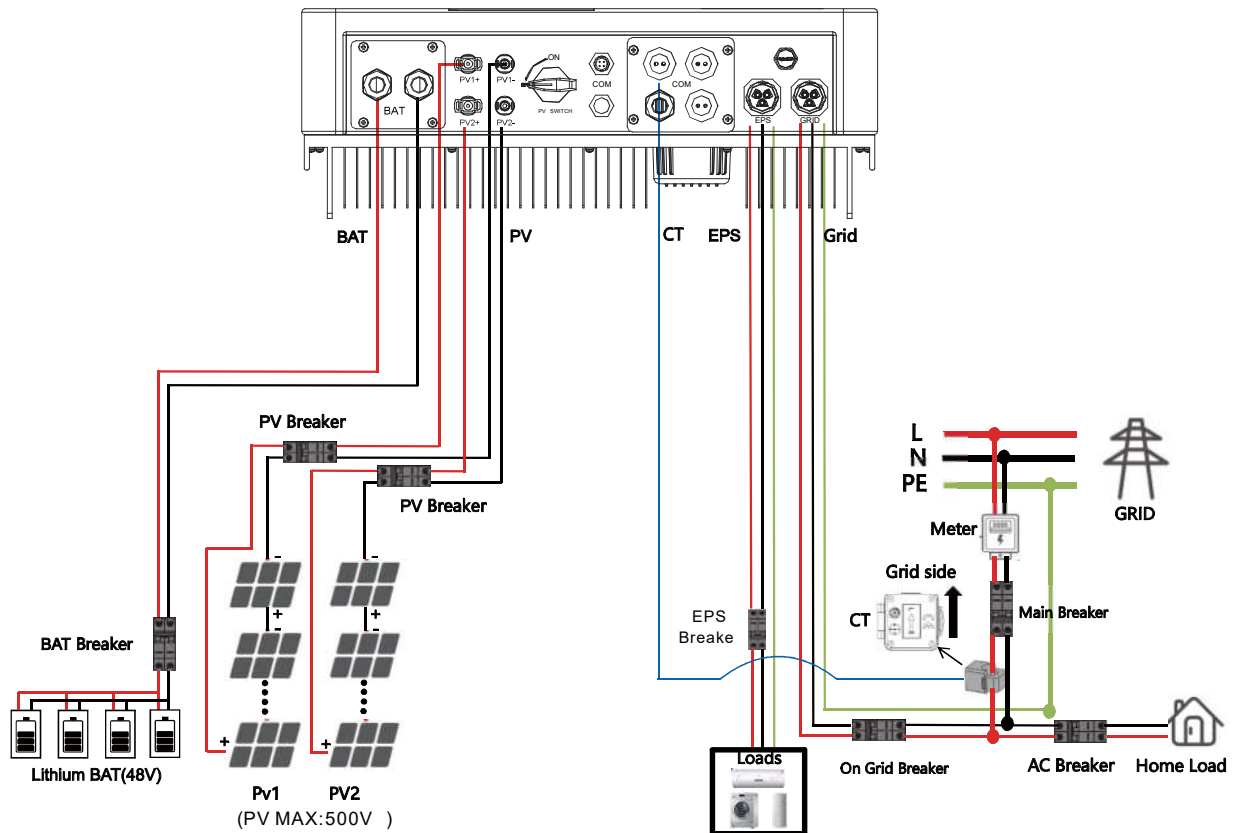
Note: If the power of the load on the grid side exceeds 6kw, it is necessary to replace the CT with a higher ratio. You can either purchase the CT yourself or contact the inverter supplier.

4.1 Grid connection and EPS connection

● Hybrid inverter are designed for single phase grid. Voltage is 220/230/240V, frequency is 50/60Hz.
● Other technical requests should comply with the requirement of the local public grid.

Table 1 Cable and Micro-breaker recommended

Model	CJ-3KSL1	CJ-3K6SL1	CJ-4KSL1	CJ-4K6SL1	CJ-5KSL1	CJ-6KSL1
Cable	10-12AWG			10AWG		
Micro-breaker	20A			32A		

Micro-breaker should be installed between inverter and grid, any load should not be connected with inverter directly.

Step1. Check the grid voltage.

1.1 Check the grid voltage and compare with the permissive voltage range (Please refer to technical data).

1.2 Disconnect all inverter power supply to prevent electric shock

Step2. Remove the waterproof lid from the grid port on the inverter.
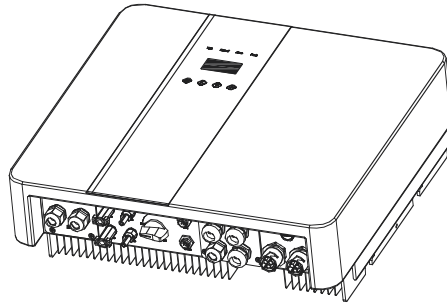
Step3. Make AC and EPS wires.

3.1 Choose the appropriate wire(Cable size: refer to Table 1).

3.2 Reserve about 60mm of conductor material sectional area and remove 10mm of insulation from the end of wire.

3.3 Separate the docking screw cap of the AC terminal from the housing portion and insert stripped wires into AC terminal and tighten the screws with a hexagonal wrench.

3.4 Tighten the docking screw cap and housing portion of the AC terminal.
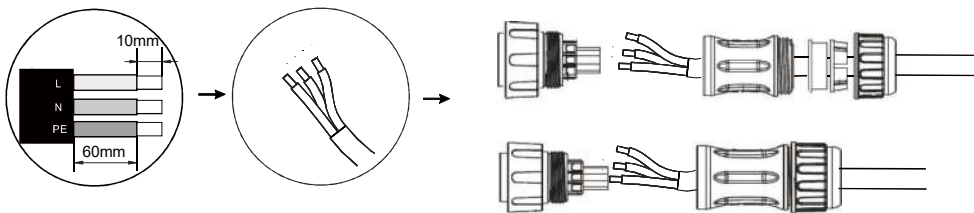
Step4. Connect the AC connector to the GRID port of the inverter and tighten the screw cap .Connect the LOAD connector to the EPS port of the inverter and tighten the screw cap .

Note: Connect the AC connector to the GRID into grid interface.

EPS
GRID
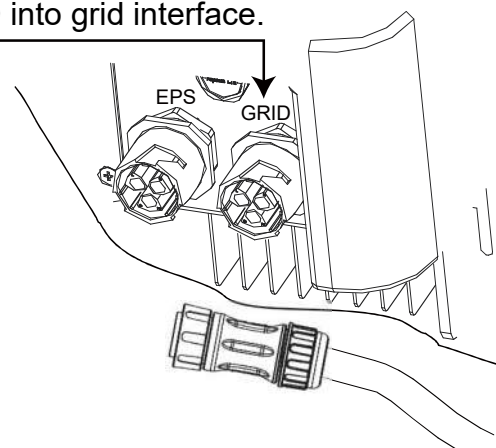
Note: After connecting the gridlines, attach the CT to the L lines, ensuring it points towards the grid side.

4.2 PV connection

- Hybrid Inverter can be connected in series with 2-strings PV modules for 3KW,3.6KW,4KW,4.6KW,5KW and 6KW.
- Select PV modules with excellent function and reliable quality. Open-circuit voltage of module arrays connected in series should be <Max. DC input voltage;operating voltage should be conformed to MPPT voltage range.

Max.DC Voltage Limitation

Model	CJ-3KSL1	CJ-3K6SL1	CJ-4KSL1	CJ-4K6SL1	CJ-5KSL1	CJ-6KSL1
Max. DC Voltage (V)	550					
MPPT Voltage Range(V)	125-500					

⚠️ **Warning!**
- PV module voltage is very high, which already achieve dangerous voltage range, please comply with electric safety rules when connecting.
- Please do not make PV positive or negative ground!

Connection Steps:

Step1. Checking PV module to ensure PV is in open circuit state and ensure the PV+ and PV- ports of the PV string are correct.
Step2. Separating the DC connector.
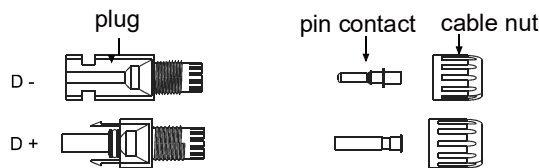
Step3. Wiring
   3.1 Choose the 12 AWG wire to connect with the cold-pressed terminal.
   3.2 Remove 10mm of insulation from the end of wire.
   3.3 Insert the insulation into pin contact and use crimping plier to clamp it.
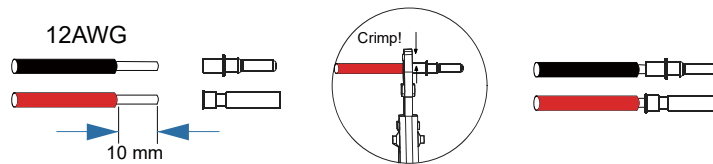
Step4. Insert pin contact through the cable nut to assemble into back of the male or female plug.
When you hear a "click" sound, it indicates that the pin contact assembly is properly seated.
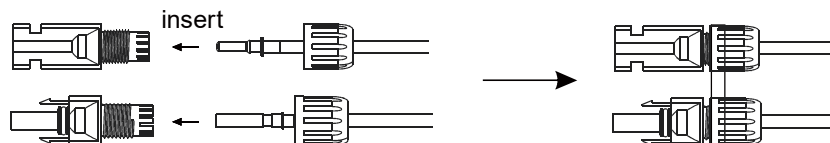
Step5. Plug the PV connector into the corresponding PV connector on inverter.
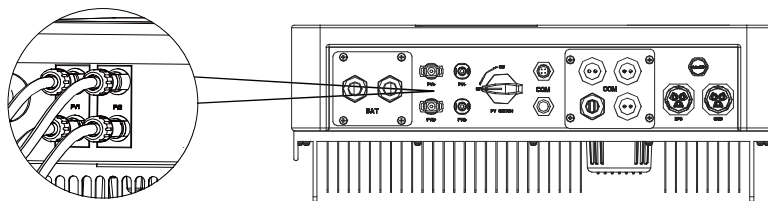
4.3 Battery Connection

Note

1.Before choosing battery, please note the maximum voltage of battery can not exceed 59V and the rated voltage of battery can not exceed 48V, and the battery communication should be compatible with Hybrid inverter.

2.Before connecting to battery, please install a nonpolarized DC(125A) breaker to make sure inverter can be securely disconnected during maintenance.

3.The connecting cable between the battery and the inverter shall be at least 4AWG.

4.The battery communication can only work when the battery BMS is compatible with the inverter.

5.To replace the battery, you need to turn off all switches and unplug the system communication line.

6.All the above wiring and operations must be carried out after the whole machine is powered down, and all of them need professional personnel to complete

Power Connection Steps:

Step1. Choose the 4AWG wire and strip the cable to 15mm.

Step2. Select two O-terminals with an aperture of M6.

Step3. Insert the stripping line into the O-terminal and clamp it with a crimping clamp.

Step4. Remove waterproof cover plate.

Step5. Disassemble the waterproof connector and pass the cable through the waterproof connector.
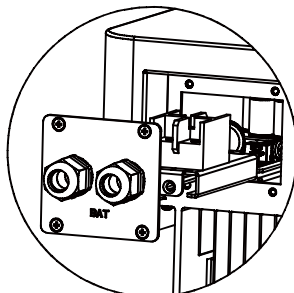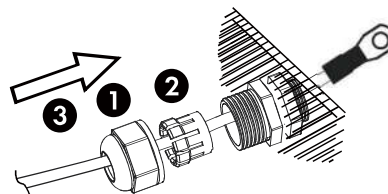
Step4   Step5

Step6. Connect the cable to the terminal of the inverter .

Step7. Assemble waterproof connectors and waterproof covers plate.
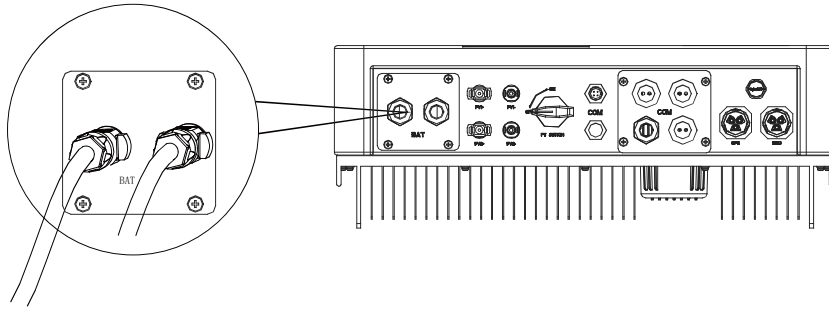
Note: Ensure that positive and negative lines are not reversed.
The positive pole should be on the left and the negative pole on the right.

4.4 Communication interface definition

BMS PIN Definition

- Communication interface between inverter and battery is RS485 or CAN with a RJ45 connector.
- The wiring sequence of the crystal head conforms to the 568B standard: orange white, orange, green white, blue, blue white, green, brown white and brown.

	PIN	1	2	3	4	5	6	7	8
CAN	Definition	X	X	X	BMS_CANH	BMS_CANL	X	X	X
Rs485	Definition	X	X	X	X	X	GND	BMS_485A	BMS_485B

DRY_IO (RJ45 PIN) Definition

1	2	3	4	5	6	7	8
COM1	NO 1	NC 1	DI 1A	DI 1B	COM2	NO 2	NC 2

DRM Connection

- DRM is provided to support several demand response modes by emitting control signals as below.

1	2	3	4	5	6	7	8
DRM1/5	DRM2/6	DRM3/7	DRM4/8	+5V	DRM0	GND	GND

4.5 WiFi And GPRS Connection(optional)

● Inverter provides a WiFi port which can collect data from inverter and transmit it to monitoring-website by WiFi.

Step1. Plug Wifi into "COM" port at the bottom of the inverter.
Step2. Build the connection between the inverter and router.
Step3. Create a user account online.(Please check the WiFi user manual for more details).

Diagram

COM

1	2	3	4
+5V	RS485_A	RS485_B	GND
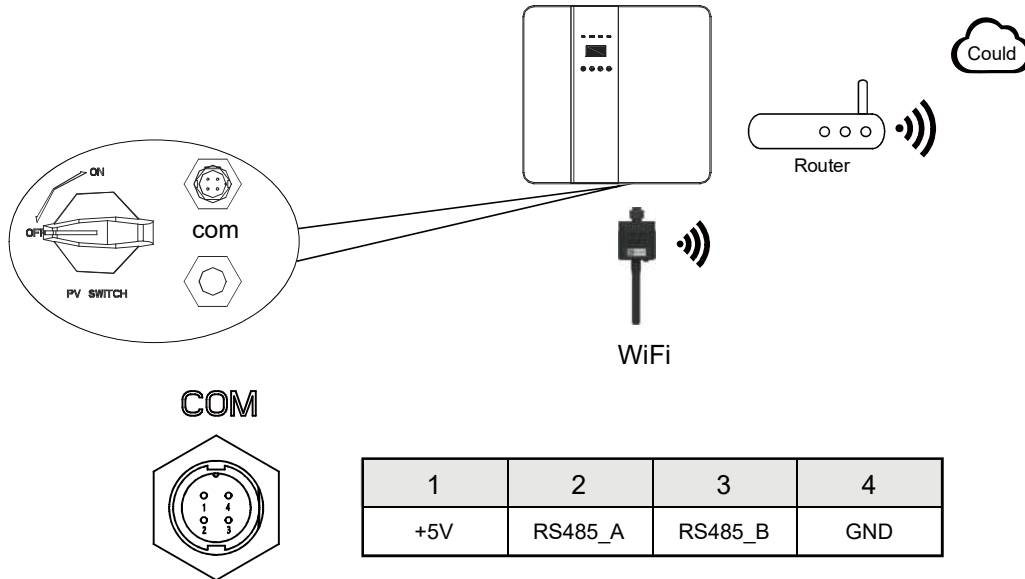
GPRS Connection :

● GPRS connection interface is consistent with WIFI interface,Please refer to the GPRS user manual for detailed connection steps.

Diagram
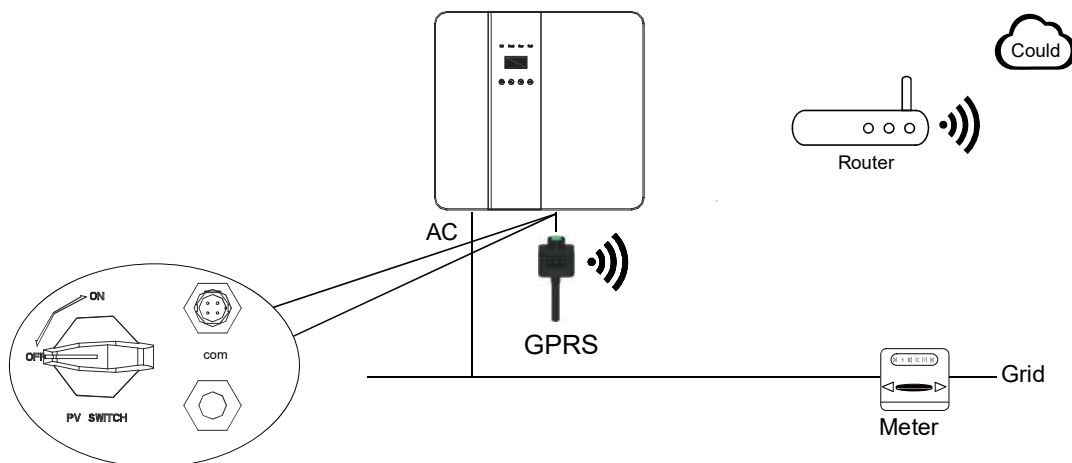
4.6 Inverter Parallel Guide

4.6.1 Parallel System Diagram

Multiple inverters can be installed together to deliver more power. When AV loads are present, all units effctively share the load. The system diagram is as follows.

Parallel System Diagram 1# Independent CT connection Method, Default connetion method.

Parallel System Diagram 2 （Common CT connection Method）

For parallel to 3 units and more, please connect the parallel network cable to this port.

Note: If using Common CT connection Method,Please contact your dealer to purchase a larger capacity CT to ensure sampling accuracy.

1.The Update port: For on-premises upgrades.
2.The BMS port: BMS communication for lithium batteries.
3.The CT port: For external grid side CT to detect current size.
4.CAN port: Parallel port.
5.NTC/CAN port: The reserved port can be used as a parallel port.

For parallel communication ,CAT 5 cables are needed. The units should be connected hand by hand.

When using common batteries, BMS cable needs to be connected to the master unit. The inverter shares the BMS information by inter-unit parallel communication cable.

4.6.2 Parallel Operation Notes

- Make sure all the units in parallel are with the same software version.

USER->INQUIRE->FIRMWARE

```
              FIRMWARE
    ARM:        V1.XX.XX

    DSP:        V1.XX.XX
```

- Connect the loads of the two inverters together first. It should be noted that the grid power line and the load line of the two inverters should be roughly the same length. If user wants to add grid /load ac breaker, please make sure the lines are paralleled/jointed before connected to breaker.

- Make sure the CT Limiter sensor is installed properly .

- Please note that the slaver unit will be in the same work mode automatically as the master unit.

4.6.3 Parallel System Setting

- The parallel setting page can be visited in the following steps in the screen:

USER->1. SETUP->PASSWORD CHECK->15.parallel

Interface	Description
Parallel → 1.NUM 2.MASTER/SLAVER 3.ADDRESS 4.COMMON CT 5.PHASE A/B/C 6.DISCHARGE CURR 7.CHARGE CURR 8.PARALLEL EN	This interface shows parallel setting. 1. Total numbers of the inverters.（Up to four parallel machinesare supported） 2. In a parallel system,the master unit broadcasts the bms and other information to the slavers. Make sure only one unit is confiqued as master. 3. Local unit addresses (1-8) cannot be duplicated. 4. Common CT Enable (If using Common CT connection Method, this feature needs to be enabled.) 5. Local phase of unit for three -phase installation. (reserved function) 6. DISCHARGE CURR, Total battery discharge current command, only be settable in master unit in parallel mode. 7. CHARGE CURR, Total battery charge current command ,only be settable in master unit in parallel mode. 8. PARALLEL EN,Enable/Disable the parallel function.

Interface	Description
ERROR 11:parallel fail	A parallell warning may occur because of the following reasons: 1. Wrong setup of the parallel num. 2. Wrong inter-unit parallel communication cable. 3. Wrong setup of the unit address.

Note: Supports up to 4 machines connected in parallel.

4.7 Generator Use Operation Guide

4.7.1 Generator Use Diagram

● The Generator is connected to the grid port of the inverter. The connecting cable shall be covered with CT. It is used in some off gird situations. The system diagram is as follows.
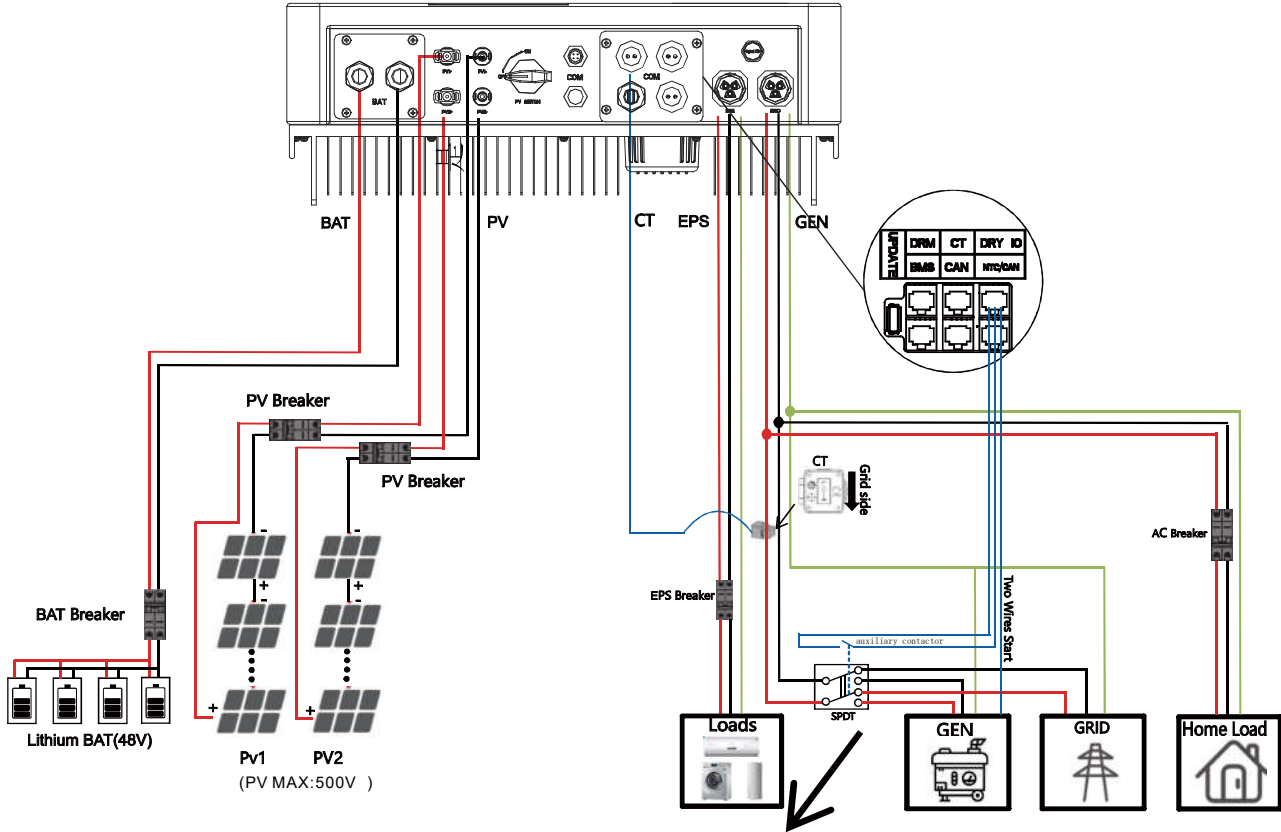
Note: 1.Generator function can only be used off-grid, When the generator switch is turned on, the switch of auxiliary contactor should also be turned on, and the switch at the grid should be turned off.

2.The range of generator voltage and frequency is synchronized with the custom range in the grid standard.

3. SPDT recommends circuit breakers with mechanical interlocking control.

DRY_IO (RJ45 PIN) Definition

Reserved dry contact interface of the inverter.
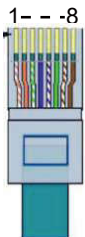
1	2	3	4	5	6	7	8
COM1	NO 1	NC 1	DI 1A	DI 1B	COM2	NO 2	NC 2

COM1 and NO1 as the dry contact of the generator.DI 1A and DI 1B are mainly used to identify signal points of the generator, which are connected at both ends of the auxiliary contact.

4.7.2 Generator Operation Notes

- The two wires start signal COM1 and NO1 of the Generator is used to automatically control the start and stop of the Generator.
- Make sure all the units software version support Generator function.

USER->INQUIRE->FIRMWARE

```
┌─────────────────────────────┐
│         FIRMWARE            │
│  ARM:        V1.XX.XX       │
│                             │
│  DSP:        V1.XX.XX       │
└─────────────────────────────┘
```

- Please check the diagram above.

4.7.3 Setting

Interface	Description
Generator → 1:START SOC 2:STOP SOC 3:ChqCurrToBAT 4:MAX RUN TIME 5:COOLDOWN 6:CONTRL 7:POWER	This interface shows Generator setting. 1.When the SOC of battery is lower than the setpoint，the Generator drycontact is enabled and Generator Manual operation is disabled, the connected Generator will be started. 2When the SOC of battery is higher than the setpoint，the Generator drycontact is enabled and Generator Manual operation is disabled, the connected Generator will be stopped (START SOC＜STOP SOC). 3It indicates the maximum current that the inverter charges the battery from Generator. 4It indicates the longest time Generator can run in one day, when time is up, the Generator will be turned off. The value 240 means 24hours in which state the Generator will not be shut down all the time. The unit is 0.1 hour. 5.It indicates the waiting time of the Generator to restart after it has reached the running time.The unit is 0.1 hour. 6.Refer to 4.7.4 CONTRL. 7.Rated power of Generator.

4.7.4 CONTRL

Interface	Description
GEN CONTROL → 1:Generator En 2:Charge En 3:Auto Start 4:Manual Mode	This interface shows Generator CONTRL. 1.Enable control of the Generator function. 2.Generator Charge Enable control . 3.If the user wants the Generator to be controlled manually, disable it. If the user wants the Generator to be automatically controlled to start and stop through the dry contact, enable it.(The default is AutoCtrl En). Manual En should be opposed to AutoCtrl En . 4.The on/off command in manual control mode .

4.7.5 GENERATOR EN

Interface	Description
GENERATOR EN ⟶ 1:DISABLE 2:ENABLE 3:SWITCH EN	This interface shows Generator enable. 1.Disable generator mode. 2.Enable the generator mode. 3.Enable generator mode control via auxiliary contact.

4.7.6 GENERATOR PAGE DISPLAY

- If you select Enable in the generator Enable page, the generator display page will be directly displayed in the main interface.
- If Switch enable is selected in the generator Enable page, the generator display page will be displayed only when the auxiliary contact switch is closed.

Interface	Description
GEN INFO 1 VOLT:　　　0.0V CURR:　　　0.00A FREQ:　　　0.00Hz	This page mainly displays generator voltage, current, frequency parameters.

Interface	Description
GEN INFO 2 POWER:　　　0W	This page displays the generator power parameters.

4.8 Three Phase Forming Connection
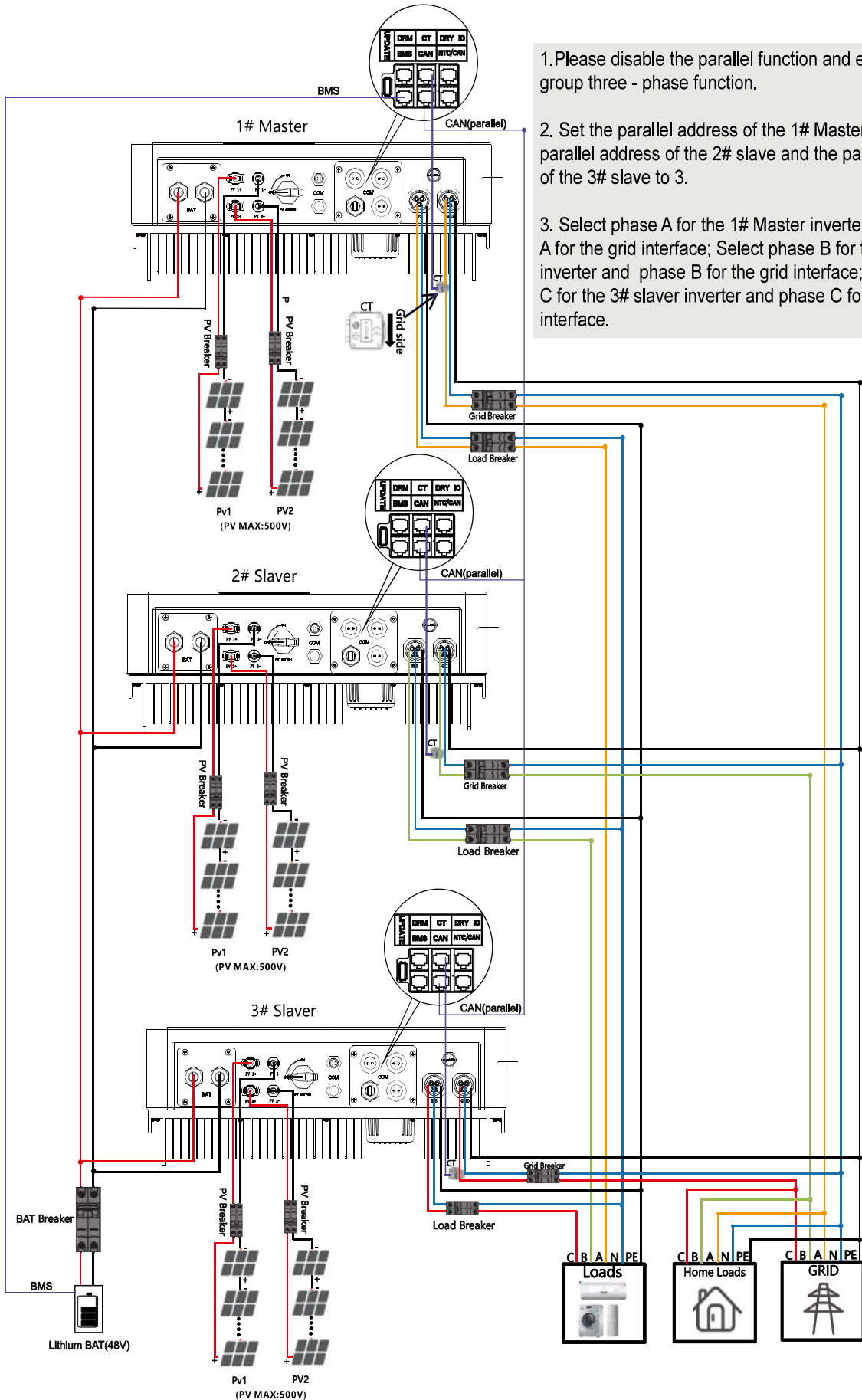
1.Please disable the parallel function and enable the group three - phase function.

2. Set the parallel address of the 1# Master to1, the parallel address of the 2# slave and the parallel address of the 3# slave to 3.

3. Select phase A for the 1# Master inverter and phase A for the grid interface; Select phase B for the 2# slaver inverter and phase B for the grid interface; Select phase C for the 3# slaver inverter and phase C for the grid interface.

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For 3 Phase communication ,CAT 5 cables are needed. The units should be connected hand by hand.

When using common batteries, BMS cable needs to be connected to the master unit. The inverter shares the BMS information by inter-unit parallel communication cable.

4.8.1 Three Phase Operation Notes

● Make sure all the units in 3 Phase communication are with the same software version.

USER->INQUIRE->FIRMWARE

```
            FIRMWARE
   ARM:         V1.XX.XX

   DSP:         V1.XX.XX
```

● Connect the load line and the power grid line separately, and it should be noted that the load line and the N line of the grid line need to be connected together.

● Make sure the CT Limiter sensor is installed properly.

● Please note that the slaver unit will be in the same work mode automatically as the master unit.

4.8.2 Three Phase System Setting

● The 3 Phase setting page can be visited in the following steps in the screen:

USER->1. SETUP->PASSWORD CHECK->15.parallel

Interface	Description
Parallel → 1.NUM 2.MASTER/SLAVER 3.ADDRESS 4.COMMON CT 5.PHASE A/B/C 6.3PHASE EN 7.DISCHARGE CURR 8.CHARGE CURR 9.PARALLEL EN	This interface shows parallel setting. 1. In a group three-phase system, the number of settings is 3. 2. In 3 phase system,the master unit broadcasts the bms and other information to the slavers. Make sure only one unit is configued as master. 3. Local unit addresses (1-8) cannot be duplicated.(The master is set to address 1) 4. Common CT Enable (If using Common CT connection Method, this feature needs to be enabled.) 5. Local phase of unit for three -phase installation. (It should be noted that the master selects phase A, slave 2 selects phase B, and slave 3 selects phase C) 6.3PHASE should be enable. 7. DISCHARGE CURR, Total battery discharge current command, only be settable in master unit in parallel mode. 8. CHARGE CURR, Total battery charge current command ,only be settable in master unit in parallel mode.

Note:

1.In the group three-phase system, the main load and the grid line must be connected as phase A, the load of 2# slave and the grid line must be connected as phase B, and the load and grid line of 3# slave must be connected as phase C.

5. LCD Interface and Setting

5.1 Control Panel
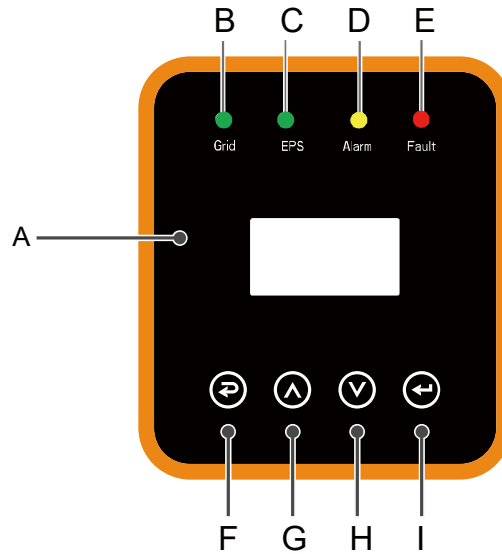
Object	Name	Description
A	LCD Screen	Display the information of the inverter.
B	Indicator LED	lit in green: The inverter is in grid mode. Off: The inverter is in not in grid mode.
C		lit in green: The inverter is in off-grid mode. Off: The inverter is in not in off-grid mode.
D		lit in Yellow: The inverter is in warning . Off: The inverter has no Inverter warning
E		lit in red: The inverter is in fault status. Off: The inverter has no errors.
F	Function Button	Esc: Return from current interface or function.
G		Up: Move cursor to upside or increase value.
H		Down: Move cursor to downside or decrease value.
I		Enter: Confirm the selection.

5.2 Instructions for LED Indicator

	Grid (Green)	EPS (Green)	Alarm (Yellow)	Fault (Red)
Initialization	off	off	off	off
Stand-by	off	off	off	off
Grid mode	on	off	off	off
Off-Grid	off	on	off	off
Bypass of mains	off	on	on	off
Fault	off	off	off	on

5.3 Instructions for the use of three modes

```
                                                                  ┌ 1、SELF CONSUME
                                            ┌ 1、WORK MODE  ┤ 2、PEAK SHIFT
                                            │ 2、EPS ENABLE    └ 3、BAT PRIORITY
                                            │ 3、BAT WAKE-UP   ┌ 1、INDEPENDANT
                                            │ 4、PV INPUT      ┤ 2、PARALLEL  (Test mode)
                                            │ 5、Anti Reflux   └ 3、CV  (Test mode)
                           ┌ 1、SYS SETTING ┤ 6、HOME LOAD
                           │                │ 7、BMS Aux MANAGE
                           │                │ 8、ZERO EXPORT POWER
                           │                │ 9、BAT LOW CAP STANDBY
                           │                │ 10、NO BAT LV ALARM
                           │                └ 11、CT BATIO
                           │                                    ┌ 1、DC-SOURCE
                           │                ┌ 1、BAT TYPE       ┤ 2、LEAD-ACID
                           │ 2、BAT SETTING ┤ 2、DISC-DEPTH     └ 3、Lithum-48V
                           │                │ 3、CHARG-CURR
                           │                └ 4、BAT-COMM       ┌ 1、RS485
                           │                                    └ 2、CAN
                           │                                    ┌ 1、POWER FACTOR
                           │ 3、GRID STD    ┌ 1、REACT MODE    ┤ 2、REACT POWER
                           │ 4、RUN SETTING ┤ 2、GRID POWER     │ 3、QU WAVE
                           │ 5、485 ADDRESS │ 3、DISC POWER     └ 4、QP WAVE
                           │                │ 4、VAC-MIN
                           │                │ 5、VAC-MAX
                           │                │ 6、FAC-MIN
 1、SETUP ─────────────────┤                │ 7、FAC-MAX
                           │                │ 8、ACTIVE REP
                           │                └ 9、GRID RECONNE
                           │                ┌ 1、2400bps
                           │ 6、BAUD-RATE   ┤ 2、4800bps
                           │                └ 3、9600bps
                           │                ┌ 1、中文
                           │ 7、LANGUAGE    ┤
                           │                └ 2、ENGLISH
                           │ 8、BACKLIGHT
                           │ 9、DATE/TIME
                           │ 10、CLEAR REC
                           │ 11、PASSWORD
                           │ 12、MAINTENANCE
                           │ 13、FCTRY RESET
                           │ 14、AUTO TEST(Italian certification)
                           │ 15、PARALLEL
                           │ 16、GENERRATOR
                           └ 17、ADVAN SET

              ┌ 1、INV MODULE                            ┌ 1、E-TODAY
              │ 2、MODULE SN                             │ 2、E-MONTH
 2、INQUIRE ──┤ 3、FIRMWARE          3、STATISTIC ───────┤ 3、E-YEAR
              │ 4、RECORD                                └ 4、E-TOTAL
              └ 5、DIAGNOSE
```

For example,Before selecting the mode, you can set it up ac cording to the local power grid,PV input mode and battery type.

Power grid：

Circular display interface	→ Press Esc button →	User	→ Select 1：Set up Press Enter button →	Enter password

Default password 00000
Press UP/DOWN button
Adjust the figure.
↓

Circular display interface	← Press Enter button ←	Choose according to local power grid	← Press Enter button ←	3:GRID STD

PVinput mode：

Setting	→ Enter password Press Enter button →	1:SYS SETTING	→ Press Enter button →	6 PV INPUT

Press Enter button
↓

Select PV input mode,Press enter to confirm

Battery parameters：

Setting	→ Enter password Press Enter button →	1:BAT TYPE	→ Press Enter button →	Set corresponding battery type,Press enter to confirm.

5.4 LCD Interface

5.4.1 Error information

Interface	Description
ERROR NO. 🔒 02:Bat Disconnect 27:BMS Comm.fail	Numbers represent error codes and text is error information. Refer to Chapter 9 for specific contents. NOTE: When there is a lock mark 🔒 in the upper right corner of the screen, you can not turn the page,you need to press Enter to unlock it first.

5.4.2 System setting1

Interface	Description
SYSTEM 1 STATE : SELF CSM GRID : US-CA PV I/P : PARALL	State: Setting of the whole machine working mode. Including:SELF CONSUME, PEAK SHIFT and BAT PRIORITY. Refer to Chapter 3.3 for specific contents. Grid standard: Displays the grid standard actually set. PV input mode: The display value is the setting value of PV input type. Including: INDÉPENDANT, PARALLEL, CV. Settings and explanations are provided in section 5.5.4.4

5.4.3 System setting2

Interface	Description
SYSTEM 2 BMS Com : CAN Anti Reflux : DISA DOD : 80%	BMS Com: Battery Management System communication mode.Including: CAN, RS485. Anti Reflux: Displays Whether Inverter isn't allowed to generate electricity to the Grid. Including: DISABLE,ENABLE. DOD: Depth of battery discharge. When the battery discharge exceeds the DOD parameter, the inverter generates a low voltage or under voltage alarm,and the battery stops discharging.

5.4.4 System setting3

Interface	Description
SYSTEM 3 EPS ENABLE : ENAB	EPS ENABLE: When the Grid and PV are powered off, Enable the battery to supply power to the load, default option is enable.

5.4.5 PV1 Input display interface

Interface	Description
PV1 INPUT VOLT : 300V CURR : 10.00A POWER : 3000W	PV1 input real-time voltage, current and power.

5.4.6 PV2 Input display interface

Interface	Description
PV2 INPUT VOLT : 300V CURR : 10.00A POWER : 3000W	PV2 input real-time voltage, current and power.

5.4.7 DC Voltage interface

Interface	Description
DC VOLTAGE BUS : 384V	BUS: Real-time voltage of bus capacitor of the machine.

5.4.8 Battery interface

Interface	Description
BATTERY VOLT : 50V CURR : 10.00A STA : C D F	Battery real-time voltage. Battery real-time current. STA: Battery status. C: Indicates that the battery is rechargeable (From the BMS) D: Indicates that the battery can discharge (From the BMS) F: The battery requests a forcible charge (From the BMS)

5.4.9 Battery current interface

Interface	Description
BATTERY INFO TYPE: Lithium TEMP: 26°C SOC: 30%	TYPE: Battery type:(lead acid, lithium battery) TEMP: Battery temperature. SOC: Percentage of battery surplus capacity from the BMS

5.4.10 Battery current interface

Interface	Description
BMS PRMETER CHAR VOL: 0.0V CHARGE: 50A DISCHA: 50A	CHAR VOL: Battery charging voltage. CHARGE: Battery charging current. If the inverter is in parallel state and uses Common battery setting, the charging current on the master is equal to the value uploaded by the BMS divided by the number of parallel machines. The charging current on the slave is equal to the value uploaded by the BMS and is compared with the value set on the master, the minimum value is taken and divided by the number of parallel machines. DISCHA:Battery discharging current. (The parallel state is the same as the charging value algorithm)

5.4.11 Grid output

Interface	Description
GRID OUTPUT VOLT: 0.0V CURR: 0.00A FREQ: 0.00Hz	VOLT: Gird real-time voltage. CURR: CT real-time current. FREQ: Grid real-time frequency.

5.4.12 INV output

Interface	Description
INV OUTPU TVOLT: 0.0V CURR: 0.00A FREQ: 0.00Hz	VOLT: INV real-time voltage. CURR: INV real-time current. FREQ: INV real-time frequency.

5.4.13 EPS LOAD

Interface	Description
EPS LOAD VOLT: 0.0V CURR: 0.00A PERCENT: 0%	VOLT: LOAD real-time voltage. CURR: LOAD real-time current. PERCENT: LOAD real-time percentage.

5.4.14 POWER

Interface	Description
POWER INV: 0.0W GRID: 0.0W HOMELOAD: 0.0W	INV: INV power. GRID: Grid power. HOMELOAD: Power of grid-side load

5.4.15 POWER

Interface	Description
POWER PV I/P: 0W EPSLOAD: 0W BAT: 0W	PV I/P: PV power. LOAD: LOAD power. BAT: BAT power.

5.4.16 Temperature

Interface	Description
TEMPERATURE INVER: 0°C DCDC: 0°C INSIDE: 0°C	INVER: INV Temperature. DCDC: DCDC Temperature. INSIDE: Internal ambient temperature of the machine.

5.4.17 State

Interface	Description
STATE SYS: STANDBY INV: STANDBY DCDC: STANDBY	System information: Display complete machine status information, including: INIT, STANDBY, PV GRID, BAT GRID, BYP, AC BAT CHG, HYBRID POW etc. INIT: Initialization PV GRID: PV generates electricity for the grid. BAT GRID: Battery discharges to the power grid. BYP: By-pass band load. AC BAT CHG: The grid charges the battery HYBRID POW: Hybrid power supply(Multiple Power Supply). INV: Displays the inverter status information,including: STANDBY, OFF GRID, GRID, OFF GRID PL, INV TO PFC.GRID: Grid connected state. OFF GRID PL: Working state of off-grid conversion to grid connection INV TO PFC: Status of power by public grid turn into on grid working mode. DCDC: Displays charging and discharging status information, including: STANDBY, CHARGE, DISCHARGE.

5.5 Settings

5.5.1 State

Interface	Description
USER → 1:SETUP 2:INQUIRE 3:STATISTIC	SETUP: Press Enter to user settings interface. INQUIRE: Query machine model, serial number, software version. STATISTIC: View machine run statistics.

5.5.2 SET Password

Interface	Description
PASSWORD INPUT :　　XXXXX	Enter the password required for setting. The default password is"00000". Press the Up or Down keys to adjust the number, press the Enter key to move the cursor forward, and press the Esc key move the cursor backward.

5.5.3 System setting

Interface	Description
SETUP → 1:SYS SETTING 2:BAT SETTING 3:GRID STD 4:RUN SETTING 5:485 ADDRESS 6:BAUD RATE 7:LANGUAGE 8:BACKLIGHT 9:DATE/TIME 10:CLEAR REC 11:PASSWORD 12:MAINTENANCE 13:FCTRY RESET 14:AUTO TEST 15:PARALLEL 16:GENERATOR 17:ADVAN SET	This interface is used for various information inquiry options. Press the Up/Down button to make the corresponding selection. Press Enter button to enter the selected menu. Press ESC button return to the user interface.

5.5.4 System setting

5.5.4.1 System setting

Interface	Description
SYS SETTING → 1: WORK MODE 2: EPS ENABLE 3: BAT WAKE-UP 4: PV INPUT 5: Anti Reflux 6: HOME LOAD 7: BMS Aux MANAGE 8: Zero Export Power 9: BAT LOW CAP STANDBY 10: NO BAT LV ALARM 11: CT BATIO	This interface is used to access system information. Press Up/Down button to move corresponding options. Press Enter to enter the selected menu. Press ESC button to return to the setting interface.

5.5.4.1.1 Work mode

Interface	Description
WORK MODE → 1:SELF CONSUME 2:PEAK SHIFT 3:BAT PRIORITY	This interface is used to select the working mode. Press ESC button return to setting interface. (Refer to 1.4)

5.5.4.1.2 Peak shift work time

Interface	Description
WORK MODE 1:SELF CONSUME → 2:PEAK SHIFT 3:BAT PRIORITY	This interface is used to select the working mode. Press ESC button return to setting interface. (Refer to 1.4). Select the peak clipping and valley filling mode, you also need to set the charge and discharge time. It's allowed to set Three charging and discharging periods.
WORK TIME → 1:TIME 1 2:TIME 2 3:TIME 3	When setting the time, ensure that the time of the inverter is the local time. Press Enter to enter the next menu. This parameter is set for one day. If the specified time conflicts, the first time is used as the main time perform. If the three time ranges do not conflict, the three time ranges are executed in sequence.
CHAG START1 00:00 CHARGE END1 00:02 DISC START1 00:03 DISCHA END1 23:59	This interface is used to adjust the time of peak load shifting. Press Up/Down button to move the corresponding options. Press Enter to enter the selected menu. Press Esc button to return to the working mode interface.

5.5.4.2 EPS enable

Interface	Description
EPS ENABLE → 1:DISABLE 2:ENABLE	When the Grid and PV are powered off, Enable the battery to supply power to the load, default option is enable.

5.5.4.3 Battery wake-up

Interface	Description
WAKE-UP EN → 1:DISABLE 2:ENABLE	When the battery is low and the battery relay has been disconnected, the inverter will send instructions to the battery forcibly sucking relay by BMS, and the inverter will charge. The default option is disabled. (Partial battery support) If you want to use this feature, please consult the battery brand supported by the dealer. Use it only when the battery is too low. After the battery wakes up successfully, please turn off the function otherwise it will affect the normal operation of the machine

5.5.4.4 PV INPUT MODE

Interface	Description

INPUT MODE
→ 1. INDEPENDENT
   2. PARALLEL
   3. CV
	Setup of PV Input mode.
	
	INDEPENDENT: The default Settings
	
	PARALLEL: This feature is for test use only, not customer use.
	
	CV: This feature is for test use only, no customer use.
	
	The factory setting by default is Independent,When parallel input is set to be stand-alone mode,PV power will be imbalanced.

5.5.4.5 Anti Reflux

Interface	Description
Anti Reflux → 1.DISABLE 2.ENABLE	Anti Reflux: Whether Inverter isn't allowed to generate electricity to the Grid. The default option is disabled. It's means inverter allowed to generate electricity to the Grid.

5.5.4.6 HOME LOAD

Interface	Description
HOME LOAD → 1.DISABLE 2.ENABLE	ENABLE: Statistics on the power consumption of gridside loads. The default option is enable.

5.5.4.7 BMS Aux MANAGE

Interface	Description
BMS Aux MANAGE → 1.DISABLE 2.ENABLE	ENABLE: When the BMS of the battery does not have a disable charge or discharge function, the inverter will automatically reduce the power to avoid overcharging or overdischarging the battery. The default option is disabled.

5.5.4.8 Zero Export Power

Interface	Description
Zero Export Power INPUT: +000W	For zero export power, it tells grid output power. recommend to set it as +20w~100w to ensure the hybird inverter won't feed power to grid. (-20W means to generate electricity into the grid; +20W means to draw electricity from the grid)

5.5.4.9 BAT LOW CAP STANDBY

Interface	Description
BAT LOW CAP STANDBY ⟶ 1.DISABLE 2.ENABLE	ENABLE: When there is no photovoltaic power supply at night, and the battery reports low voltage or low capacity, the machine will enter the standby state only the mains power to supply power to the load. The default option is disable.

5.5.4.10 NO BAT LV ALARM

Interface	Description
NO BAT LV ALARM ⟶ 1.DISABLE 2.ENABLE	ENABLE: When there is no photovoltaic power supply at night, and the battery reports low voltage or low capacity, the machine will enter the standby state only the mains power to supply power to the load. The default option is disable.

5.5.4.11 CT RATIO

Interface	Description
CT RATIO INPUT: 01000:1	The corresponding parameters are set according to the current proportion of CT.

5.5.5 BAT SETTING

5.5.5.1 BAT SETTING

Interface	Description

BAT SETTING
⟶ 1.BAT TYPE
    2.DISC-DEPTH
    3.CHARG-CURR
    4.BAT-COMM
	This interface is used to select battery parameters.
	
	Press Up/Down button to move corresponding options;
	
	Press Enter button to enter the selected menu;
	
	Press ESC button to return to setting interface.

5.5.5.1.1 BAT TYPE

Interface	Description
BAT TYPE → 1.DC-SOURCE 2.LEAD-ACID 3.Lithum	This interface is used to select battery type. Press Up/Down button to move corresponding options; Press Enter button to enter the selected menu. Select the LEAD-ACID enter button to enter LEAD-ACID interface; Set 1 to test and disable the setting.

5.5.5.1.1.1 Lead-acid battery parameter

Interface	Description
LEAD-ACID → 1:CHARG-VOLT 2:BAT END VOLT 3:BAT OVP 4:BAT CAP	This interface is used to select LEAD-ACID battery parameter. Press Up/Down button to move corresponding options; Press Enter button to enter the selected menu; 1. Charge voltage 2. BAT end voltage 3. BAT over voltage
CHARGE VOLT INPUT: 55.0 UNIT: V	This interface is used to set the lead acid battery charging voltage. (The inpt value ranges from 40 to 58)

Interface	Description
BAT END VOLT INPUT: 45.0 UNIT: V	This interface is used to set the lead acid battery discharging voltage. (The input value ranges from 40 to 51V) Discharge cut-off voltage, as recommended by the battery manufacturer.
BAT OVP INPUT: 55.0 UNIT: V	This interface is used to set the lead acid battery Charge protection voltage. (The input value ranges from 50 to 59.5) Charge protection voltage, as recommended by the battery manufacturer.
BAT CAP INPUT: 0450 UNIT: AH	This interface is used to set the lead acid Battery capacity. It is related to the input power. (The input value ranges from 50 to1000) The battery capacity setting will affect the maximu charging current, for example, set 100Ah, the maximum charging current is 100A*0.2=20A

5.5.5.2 DISC-DEPTH

Interface	Description
Grid DOD: 080% OffGridDOD: 080% GridReturn: 005% OffGridRet: 020%	This interface is mainly used to set the battery discharge DOD; If the Grid DOD is set at 80%, the battery can only discharge to 20% during grid-connected operation;If the OffGrid DOD is set at 80%, the battery can only discharge to 20% during off-gird operation;When the battery SOC is lower than（1-DOD), an alarm is generated. The GridReturn is used to cancel the battery alarm. When the GridReturn is set to 5% and the SOC value of 1-DOD+5% is reached, the low battery capacity alarm is cancelled. The same is true for the OffGridRet.

5.5.5.3 CHARG CURR

Interface	Description
CHARGE CURR INPUT: 25.0 UNIT: A	This interface is used to set the battery charge current.

5.5.5.4 BAT-COMM

Interface	Description
BAT-COMM 1.RS485 ⟶2.CAN	This interface is used to select battery communication BMS type. Press Up/Down button to move corresponding options; Press Enter button to enter the selected menu. The default option is CAN.

5.5.6 Grid standard

Interface	Description
GRID STD ⟶1. AU 2. AU-W 3. NZ 4. UK 5. VDE 6. KR 7. PHI 8. CN 9. US-CA 10. JP 11. CUSTOM 12. ~~~~~	This interface is used to select Grid standard. Press Up/Down button to move corresponding options; Press Enter button to enter the selected menu. 1:AU—Australia 2:AU-W-Western Australia 3:NZ—New Zealand 4: UK—United Kingdom 5:PK-PAKISTAN 6:KR—Korea 7:PHI-Philippines 8:CN—China 9:US-CA—America 10:THAIL-THAILAND 11:ZA—South africa 12:CUSTOM—User defined 13:POL—Poland 14:EN50549 15:VDE4105 16:JPN-Japan 17:ITA-Italy

5.5.7 RUN SETTING

5.5.7.1 RUN SETTING

Interface	Description
RUN SETTING 1. REACT MODE → 2. GRID POWER 3. DISC POWER 4. VAC-MIN 5. VAC-MAX 6. AC-MIN 7. FAC-MAX 8. ACTIVE REP 9. GRID RECONNE	This interface is used to select run setting. Press Up/Down button to move corresponding options; Press Enter button to enter the selected menu. Factory default Settings. Please consult the distributor for modification.

5.5.7.2 REACT MODE

Interface	Description
RUN SETTING → 1.REACT MODE 2.GRID POWER 3.DISC POWER	REACT MODE: Reactive mode, including: POWER FACTOR, REACT POWER, QU WAVE, QP WAVE. (For specific country if required by the local grid.)
REACT MODE → 1. POWER FACTOR 2. REACT POWER 3. QU WAVE 4. QP WAVE	QU WAVE: Voltage-reactive curve. QP WAVE: Active power-reactive power curve. (These two functions are not available on the screen, please contact the distributor if you need to use them.)
POWER FACTOR INPUT: C1.00	Power Factor:The input value should range between LO.80 and LO.99 or CO.8 and C1.00.
REACT POWER INPUT: +00%	REACT POWER: Reactive power control The input value should range between-60% and +60%, which varies with the standard.

5.5.7.3 GRID POWER

Interface	Description
GRID PERCENT INPUT: 100%	The input value is power percent of grid.

5.5.7.4 DISCHARGE POWER

Interface	Description
DISC PERCENT INPUT: 100%	The input value is power percent of battery discharge

5.5.7.5 VAC-MIN

Interface	Description
GRID VOLT LOW INPUT: 150 UNIT: V	The input value of Grid low voltage. It is valid when grid mode choose custom.

5.5.7.6 VAC-MAX

Interface	Description
GRID VOLT HIGH INPUT: 280 UNIT: V	The input value of Grid high voltage. It is valid when grid mode choose custom.

5.5.7.7 FAC-MIN

Interface	Description
GRID FREQ LOW INPUT: 57.0 UNIT: Hz	The input value of Grid low frequency. It is valid when grid mode choose custom.

5.5.7.8 FAC-MAX

Interface	Description
GRID FREQ HIGH INPUT: 63.0 UNIT: Hz	The input value of Grid high frequency. It is valid when grid mode choose custom.

5.5.7.9 ACTIVE REF

Interface	Description
ACTIVE Type → 1. PWR-VOLT RES 2. PWR-FREQ RES 3. PFC-VOLT RES 4. PFC-FREQ RES 5. Anti-Island 6. Leak Current 7. Insul Detect	1.PWR-VOLT RES: Generation voltage response. When the grid voltage is abnormal, the active power is limited, and the function is enabled when required by the national grid standard. 2.PWR-FREQ RES: Generation frequency response. When the power grid frequency is abnormal, the active power will be limited, and the function will be enabled if required by the national power grid standard. 3.PFC-VOLT RES: Charge voltage response. When the grid voltage is abnormal, the charging power will be limited, and the function will be enabled if required by the national grid standards. 4.PFC-FREQ RES: Charge frequency response. When the power grid frequency is abnormal, the charging power will be limited, and the function will be enabled if required by the national power grid standard. 5.Anti-Island: Anti-Islanding(The default option is enable) When the grid goes down, inverter will detect the loss of power and disconnect from the grid within milliseconds. It prevents your solar panels from feeding electricity into a downed power line. 6.Leak Current: Leak current detect (The default option is enable). 7.Insul detect: Insulation detect (The default option is enable). When the insulation detection function is enabled in the grid-connected state, the insulation detection is performed once a day when the photovoltaic energy comes in, and the inverter switches to the By-pass band load. If the inverter is off-grid, the output will be disconnected during insulation detect and the load will stop working.

5.5.7.10 GIRD RECONNECTION

Interface	Description
GRID RECONNE T-INPUT: 100 s	This interface is used to set gird reconnected time.

5.5.8   485 Address

Interface	Description
485 ADDRESS INPUT: 1	This interface is used to select 485 address.

5.5.9 485 BAUD RATE

Interface	Description
SELECT ⟶ 1.2400 bps 2.4800 bps 3.9600 bps	This interface is used to select 485 baud rate.

5.5.10 LANGUAGE

Interface	Description
LANGUAGE 1.Chinese ⟶ 2.English	This interface is used to select language.

5.5.11 BACKLIGHT

Interface	Description
LIGHT TIME INPUT: 20 UNIT: SEC	This interface is used to set light time.

5.5.12 DATE/TIME

Interface	Description
DATE/TIME DATE: 2021-12-25 TIME: 22:30:00 WEEK: Saturday	This interface is used to set date and time.

5.5.13 CLEAR REC

Interface	Description
DEL REC ⟶1.CANCEL 　　2.CONFIRM	This interface is used to clear operation history.

5.5.14 PASSWORD

Interface	Description
PASSWORD OLD:　　　XXXXX NEW:　　　XXXXX CONFIRM:　XXXXX	This interface is used to set password.

5.5.15 MAINTENANCE

Interface	Description
PASSWORD INPUT:　　XXXXX	This interface is used to enter maintenance.

5.5.16 FCTRY RESET

Interface	Description
FACTORY RESET ⟶1.CANCEL 　　2.CONFIRM	This interface is used to reset the inverter.

5.5.17 ADVAN SET

Interface	Description
ADVAN SET ⟶1.Mode Set 　2.Advan Ctrl 　3.TOU Set	The hybrid inverter can be programmed to control how and when to use grid power. The Advcanced mode allow management of flexible loads and time-of-use billing. ADVAN SET: Advanced setting include: mode setting, advanced controls, TOU setting (time-of-use setting)

5.5.17.1 Mode Set

Interface	Description
Mode Set → 1.Disable 2.Sell first 3.SFC. Sell EN 4.SFC. Sell Dis	There are three advanced mode available: Sell First ,SFC. Sell EN, SFC. Sell Dis. Sell First: First consider selling electricity to the grid.　In this mode the anti-reflux setting is automatically disabled. The users can use this mode to sell back surplus solar power to grid.　If time of use is enabled, the battery power can also be sold to grid. SFC. Sell EN : Self consumedmode electricity selling enable.　In this mode, Solar energy provides power to the loads as first priority, if solar energy is sufficient to power all connected loads, solar energy excess power will provides to charge battery, and then redundant power will feed to grid.　(See1.4 Work Modes for details) SFC.Sell Dis: Self consumedmode electricity selling disable.　In this mode, the ct limiters should be installed in the input of the inverter's grid port.　The hybrid inverter will not sell power to grid.　Users can use this feature to ensure that the inverter does not feed power back to the grid.

5.5.17.2 Advan Ctrl

Interface	Description
Advanced Control → 1. Grid Chg En 2. TOU En 3. Only PV Chg	There are also some attributes of these mode:Global Grid Charge Enable, Time-of-use Enable, Pv Charge Only. Global Grid Charge Enable: It is a high level control attribute of grid charge enable. If time of use function is disabled, this attribute is used to judge whether or not to charge the battery by grid. If time of use function is enabled ,the battery can be charged by grid only when the time slot grid charge attribute is enabled.
TOU Set Start:　　　　00:00 End:　　　　00:00 Power:　　　　00:00 Soc:　　　　00:00	Time-of-use Enable : There are 6 slots which can be programmed. If grid charge is enable, the grid is used to power the load and charge the battery to target SOC at specific bat power attribute value. If selling electricity to the grid enable, the battery will discharge to target SOC at specific battery power attribute value. Pv Charge Only: If user don't want to use grid to charge the battery in any time ,please enable this attribute. The photovoltaic energy will be used first for the load, and then the excess energy will be used to charge the battery. If the photovoltaic energy is insufficient, the battery will power the load.

5.6 INQUIRE

5.6.1 INQUIRE

Interface	Description
INQUIRE →1. INV MODULE 2. MODULE SN 3.FIRMWARE 4.RECORD 5.DIAGNOSE	Press Up/Down button to move corresponding options; Press Enter button to jump to the selected menu. Press ESC button to return to other interface.

5.6.1.1 INV MODULE

Interface	Description
MODEL 5K	This interface show inverter model..

5.6.2 MODULE SN

Interface	Description
S / N GUID: XXXXXXXX XXXXXXXXXXXXXXXX SN: FXXXXXXXXXXX	This interface show module SN.

5.6.3 FIRMWARE

Interface	Description
FIRMWARE ARM: V1.XX.XX DSP: V1.XX.XX XXXXXX XXXXXX	This interface show Software version.

5.6.4 RUNNING RECORDS

Interface	Description
REC(01) 02:Batdisconnect UP: 12-25 23:00 DOWN:	This interface show running recodes.

5.6.5 DIAGNOSE

Interface	Description
DIAGNOSE 000000 000000 000000 000000 000000 000000	Factory internal use.

5.7 STATISTIC

5.7.1 STATISTIC

Interface	Description
STAT. → 1.E-TODAY 2.E-MONTH 3.E-YEAR 4.E-TOTAL	This interface show inverter operation statistic. 1. Displays statistic for the day (KWH). 2. Displays statistic for the month (KWH). 3. Displays statistic for the year (KWH). 4. Displays statistic of the inverter (KWH).

Note: 1. E-TODAY/MONTH/YEAR/TOTAL→INPUT→PV/GRID(Consume)/BATD(Battery discharge)→OUTPUT→BATC(Batterycharge)/GRID(Generation)/CNSUM(Load consume).

2. If the inverter shut down before 24:00 on that day, and the day statistic will not be stored.

5.8 Autotest Fast

1. SETUP	Press the Enter button and default password 00000
↓	
14. AUTO TEST	Press the Enter button to start
Testing 59.S1...	
↓	Wait
Test 59.S1 OK!	
↓	Wait
Testing 59.S2...	
↓	Wait

Test 59.S2 OK!	
↓	Wait
Testing 27.S1...	
↓	Wait
Test 27.S1 OK!	
↓	Wait
Testing 27.S2...	
↓	Wait
Test 27.S2 OK!	
↓	Wait
Testing 81>S1	
↓	Wait
Test 81>S1 OK!	
↓	Wait
Testing 81>S2...	
↓	Wait
Test 81>S2 OK!	
↓	Wait
Testing 81<S1...	
↓	Wait
Test 81<S1 OK!	
↓	Wait
Testing 81<S2...	
↓	Wait
Test 81<S2 OK!	
↓	Wait
Auto Test OK!	
↓	
59. S1:228V 902ms	
↓↑	Press the up/down button to page through the test results
59.S2:229V 204ms	
↓↑	Press the up/down button to page through the test results
27. S1:228V 408ms	
↓↑	Press the up/down button to page through the test results
27. S2:227V 205ms	

↓↑	Press the up/down button to page through the test results
81>. S1 49.9Hz 103ms	
↓↑	Press the up/down button to page through the test results
81>. S2 49.9Hz 107ms	
↓↑	Press the up/down button to page through the test results
81<.S1 50.0Hz 105ms	
↓↑	Press the up/down button to page through the test results
81<. S2 50.1Hz 107ms	

Object	Description
27.S1	Under voltage protection
27.S2	Under voltage protection
59.S1	Over voltage protection
59.S2	Over voltage protection
81<S1	Under frequency protection
81<S2	Under frequency protection
81>S1	Over frequency protection
81>S2	Over frequency protection

6. Fault diagnosis and solutions

- The inverter is easy to maintain. When you encounter the following problems, please refer to the Solutions below, and contact the local distributor if the problem remains unsolved. The following table lists some of the basic problems that may occur during the actual operation as well as their corresponding basic solutions.

Fault diagnosis table

Content	Codes	Explaination	Description
Dischg Over Cur	00	Battery discharge over current. When the battery is loaded, the load is too large.	(1) Nothing need to do, Wait one minute for the inverter to restart. (2) Check whether the load is in compliance with the specification. (3) Cut off all the power and shut down all the inverter; disconnect the load and plug in to restart inverter, then check.
Over Load	01	The load power is greater than other power(PV,BAT).	(1) Check whether the load is in compliance with the maximum power of the inverter. (2) Cut off all the power and shut down all the inverter; disconnect the load and plug in to restart inverter, then check whether the load is short circuited if the fault has been eliminated. (3) Contact customer service if error warning continues.
Bat Disconnect	02	Battery Disconnect.(Battery voltage not identified)	(1) Check whether the battery is connected. (2) Check if battery wiring port is open circuited. (3) Contact customer service if error warning continues.
Bat Under Vol/ Bat Under Capacity	03	Battery voltage/SOC is lower than the set value. Both off grid and on grid discharge are forbidden.	(1) Verify the battery voltage is within operating range. (2) If the battery voltage is too low, charge using the PV or grid. (3) Battery under capacity,it is a normal warning. When the battery capacity is not sufficient. (SOC<100%-OFFGRID DOD)
Bat Low Volt/ Bat Low capacity	04	Battery voltage/SOC is lower than the set value. On grid discharge is forbidden.	(1) Battery Low that setting capacity. (SOC<100%-DOD) (2) Check the battery capacity or voltage.
Bat Over Vol	05	The battery voltage is over than the Inverter maximum voltage.	(1) Verify the battery voltage is within operating range. (2) Restart the inverter and wait until it functions.
Grid low vol	06	Grid voltage is abnormal	(1) Check if the grid is abnormal. (2) Restart the inverter and wait until it functions normally. (3) Contact customer service if error warning continues.
Grid over vol	07		
Gfci low freq	08	Grid Frequency is abnormal.	(1) Check if the grid is abnormal. (2) Restart the inverter and wait until it functions normally. (3) Contact customer service if error warning continues.
Gfci over freq	09		

Gfci over	10	Inverter GFCI exceeds standard.	(1) Check PV string for direct or indirect grounding phenomenon. (2) Check peripherals of inverter for current leakage. (3) Contact the local inverter customer service if fault remains unremoved.
Bus under vol	13	BUS voltage is lower than normal.	(1) Check the input mode setting is correct. (2) Restart the inverter and wait until it functions normally. (3) Contact customer service if error warning continues.
Bus over vol	14	BUS voltage is over maximum value.	(1) Check the input mode setting is correct. (2) Restart the inverter and wait until it functions normally.
Inv over cur	15	The inverter current exceeds the normal value.	(1) Restart the inverter and wait until it functions normally.
Chg over cur	16	Battery charge current over than the Inverter maximum voltage.	(1) Restart the inverter and wait until it functions normally.
Inv under vol	18	INV voltage is abnormal	(1) Check if the INV voltage is abnormal. (2) Restart the inverter and wait until it functions normally. (3) Contact customer service if error warning continues.
Inv over vol	19		
InvFreqAbnor	20	INV frequency is abnormal	(1) Check if the INV frequency is abnormal. (2) Restart the inverter and wait until it functions normally. (3) Contact customer service if error warning continues.
lgbt temp high	21	The inverter temperature is higher than the allowed value.	(1) Cut off all the power of the inverter and wait one hour, then turn on the power of the inverter.
BMS sys erro	22	The communication between batteries is faulty	(1) Please check whether the communication between the batteries is normal. (2) Contact customer service if error warning continues.
Bat over temp	23	This alarm is issued by the battery BMS.	Disconnect the battery and reconnect it after an hour.
Bat UnderTemp	24	This alarm is issued by the battery BMS.	(1) Check the ambient temperature near the battery to see if it meets the specifications.
BMS comm.fail	27	Communication between lithium battery and inverter is abnormal or not in communication.	(1) Check the cable, crystal, Line sequence. (2) Checking the Battery switch.
Bat Fault	28	An alarm or fault occurs in the battery system.	(1) Check whether the battery generates alarms. (2) Contact customer service if error warning continues.
Grid Phase error	30	The power grid phase sequence is incorrectly connected.	(1) Check power grid wiring
Arc Fault	31	PV Arc Fault	(1) Check Photovoltaic panels, PV wire. (2) Contact customer service if error warning continues.
Bus soft fail	32	The inverter may be damaged	(1) Restart the inverter and wait until it functions normally. (2) Contact customer service if error warning continues.
Inv soft fail	33		
BUS short	34		
Inv short	35		

Fault diagnosis and solutions

Fan fault	36	Fan fault.	(1) Check whether the Inverter temperature is abnormal. (2) Check whether the fan runs properly.(If you can see it)
PV is low	37	PV Low insulation impedance.	(1) Check if the PE line is connected to the inverter and is connected to the ground. (2) Contact customer service if error warning continues.
Bus Relay Fault	38	The inverter may be damaged.	(1) Restart the inverter and wait until it functions normally. (2) Contact customer service if error warning continues.
Grid Relay Fault	39		
EPS rly fault	40		
Gfci fault	41		
Selftest fail	44		
System fault	45		
Current Dcover	46		
Voltage Dcover	47		

Note: If an error occurs that is not listed in the table, Please Contact customer service.

V1.6