User Manual

Freedom Won Single Phase Inverters

Encore 3K, Encore 3.6K *(UK Only)*, and Encore 5K

Distributed By Freedom Won (Pty) Ltd

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Technical and Installation Assistance – Contact:

Please contact your Freedom Won Distributor/Reseller or Installer for technical and installation support. A directory of Distributors and Reseller Installers is available at www.freedomwon.co.za.

For advanced support please contact support@freedomwon.co.za.

Update Record:

Revision Number	Update Summary	Updated By	Date of Issue

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1. Introduction

1.1. Important Safety Instructions

Danger! 	• Poses a danger to life due to high voltage. • All work must be done by a qualified electrician. • The appliance is not to be used by children, or persons with reduced physical, sensory, or mental capabilities, or that lack the required experience and knowledge. • The appliance must be installed out of reach of children.
Caution!	• Danger of burn injuries due to hot enclosure parts. • During operation, the enclosure's upper lid and body may become hot. Only touch the lower lid during operation.
Caution! 	• Possible damage to health because of the effects of radiation! • Do not stay closer than 20cm to the inverter for extended periods.
Note! 	• Grounding the PV generator: • Comply with the local requirements for grounding the PV modules and the PV generator. The generator frame and other electrically conductive surfaces should be connected in a manner that ensures continuous conductivity and grounding of these items to ensure optimal protection of the system and persons.
Warning! 	• Ensure input DC voltage ≤Max. allowed DC voltage. • Overvoltage may cause permanent damage to the inverter or other losses, which will not be included in the warranty!
Warning! 	• Authorized service personnel must disconnect both AC and DC power from the inverter before attempting any maintenance or cleaning or Risk of electric shock working on any circuits connected to the inverter. • Risk of electric shock!

- Only accessories supplied with the inverter are recommended. Use of unauthorized parts may result in a risk of fire, electric shock, or injury to persons.
- Make sure that existing wiring is in good condition and that wires are not undersized.
- Do not disassemble parts of the inverter which are not mentioned in the installation guide. The inverter contains no user-serviceable parts. See the warranty document for instructions on obtaining service from the manufacturer. Attempting to service the inverter yourself may result in a risk of electric shock or fire and will void your warranty.
- Avoid fire risk. Do not expose the inverter to flammable or explosive materials.
- The installation location should be free of corrosive substances and humid condensing air.
- Authorized service personnel must use insulated tools when installing or working with this equipment. PV modules shall have an IEC 61730 class A rating.
- Do not touch either the positive or negative pole of the PV connecting device. Never touch both at the same time.
- The unit contains capacitors that remain charged to a potentially lethal voltage after the mains, battery, and PV supply have been disconnected.

- A hazardous voltage will be present for up to 5 minutes after disconnection from the power supply.
- CAUTION - RISK of electric shock from energy stored in a capacitor, never operate on the inverter couplers (plugs), 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 5 minutes to let the intermediate circuit capacitors discharge before unplugging the PV DC, battery connectors, and mains couplers.
- When accessing the internal circuits of the inverter, it is very important to wait 5 minutes before operating the power circuit or removing the electrolyte capacitors inside the device. Do not open the device beforehand since the capacitors require time to sufficiently discharge!

1.2 Explanation of Symbols

This section explains all the symbols shown on the inverter's type label.

Symbols on the Type Label

Symbol		*Explanation*
CE mark.		The inverter complies with the requirements of the applicable CE guidelines.
TUV certified.		The product is compliant with applicable safety and operating standards.
RCM remark		Regulatory Compliance Mark The product adheres to all safety regulations and is certified for sales
SAA certification.		Certified approval for declared and non-declared electrical equipment that has proven to comply with the safety requirements of the applicable Australian Standard.
Beware of the hot surface.		The inverter can become hot during operation.
The danger of high voltages		Dangerous due to high voltages in the inverter!
Danger		Risk of electric shock!
Disposal		The inverter cannot be disposed of with household waste. Disposal information can be found in the enclosed documentation.
Documentation		Observe enclosed documentation
Do not operate		Do not operate on this inverter until it is isolated from the battery, mains, and on-site PV generation supply.
Dangerous due to high voltage.		There is residual voltage existing in the inverter after power off, which needs 5 min to discharge. • Wait 5 min before you open the upper lid or the DC lid.

1.3 Basic features

The Encore 3K and 5K series inverters is a high-quality inverter range that can:

- Convert solar energy to AC energy,
- Store solar energy in batteries,
- Use battery stored energy to supply the AC output without the grid being available,
- Export excess solar energy to the grid,
- Use the grid to charge batteries if needed,
- Use the grid to support loads directly if needed,
- a fuel generator interface for backup power if needed.

The Encore 3K and 5K series inverters supply single-phase 230V AC output and are designed to operate optimally on all Freedom Won 52V LiFePO4 batteries using CAN Bus for communication between the batteries and the inverters. The Freedom Won battery ranges presently available to operate with these inverters are as follows:

- Freedom Won LiTE Home 52V
- Freedom Won LiTE Marine 52V
- Freedom Won LiTE Business 52V
- Freedom Won eTower e5000

The inverter can be used to optimize the self-consumption of solar energy by storing energy in the battery for future use. The battery can alternatively be kept fully charged from the grid with PV used to supply loads and/or to export to the grid.

The operating mode depends on the amount of PV energy installed, the size of the battery system, or the user's preference. The inverter can provide power for emergency use during grid outages by using the energy from both the battery and/or the inverter (using power generated from PV).

The inverter can be configured as per Figure 1.1 with a dedicated Essential Power Supply (EPS) as well as a grid parallel connection. The EPS provides seamless power to essential loads when the grid fails by supplying this power from a combination of battery and PV energy sources. The loads connected to this EPS must not exceed the power rating of the inverter. Larger and less important loads can be connected to the AC input side of the inverter without being concerned about the inverter's maximum output power rating. Although these loads will not receive power when the grid is off, the advantage of this configuration is that any excess PV power can be directed to these loads when the grid is on, which reduces the demand from the grid. A Current Transformer (CT) (included with inverter) is used to measure the current at the grid metering point, which allows the inverter to prevent feeding any excess energy to the grid if grid export is not desired, or not allowed. An optional changeover switch is shown in Figure 1.1 to allow diverting the essential loads to the grid directly, should the inverter need to be taken offline for maintenance.

If the users load exceeds the inverter load rating then the user must select a larger inverter with adequate power rating such as the Encore 8k or larger.

Figure 1.1 System Diagram 1 (applies to most countries)

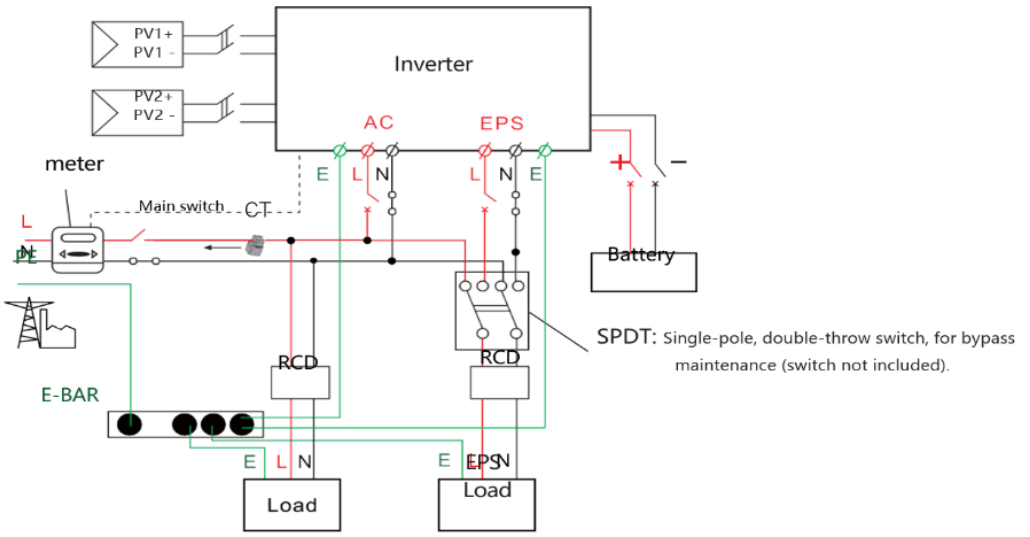
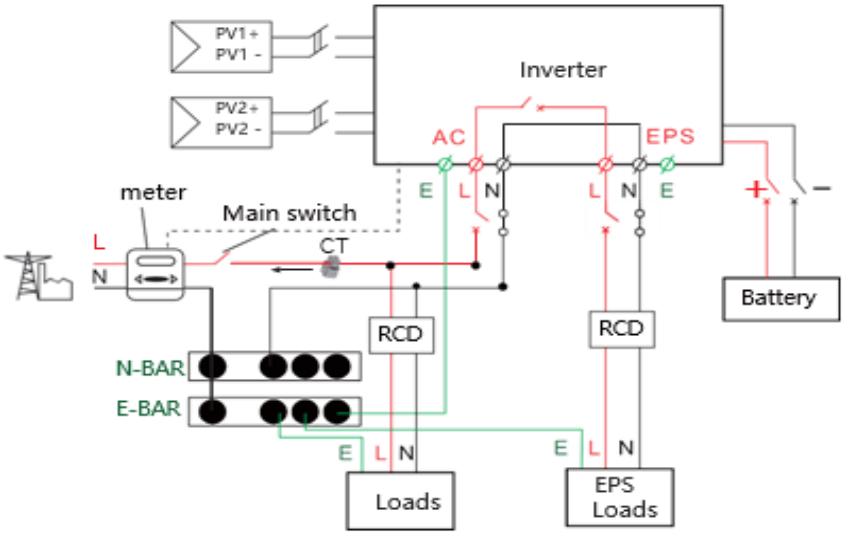


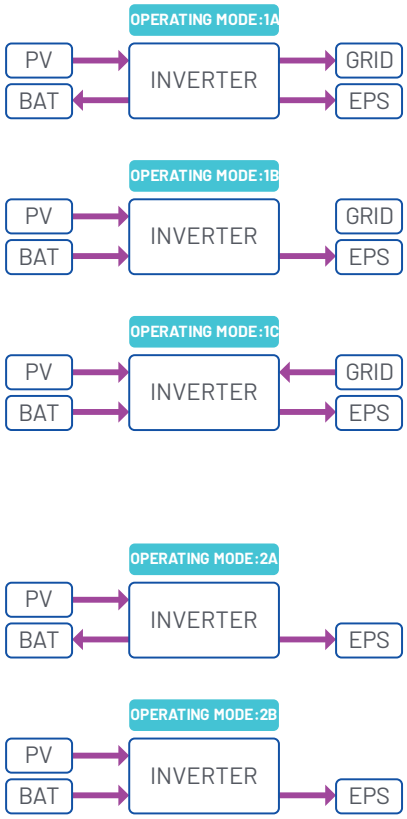
Figure 1.2 System Diagram 2 (applies to the wiring rules AS/NZS_3000:2012 for Australia and New Zealand)



	Note! The meter and switch in the above figure are not included with the inverter.

1.4 Work Modes

The Encore hybrid inverters provide multiple operating modes based on different requirements.



Operating Mode: Self-consumption or battery cycling

1.When PV, Grid, and Battery are available:

A. Solar provides power to the loads as first priority, if solar power is sufficient to power all connected loads, solar power excess will be used to charge the battery, or – if the battery is fully charged – will feed to non-essential loads or the grid.

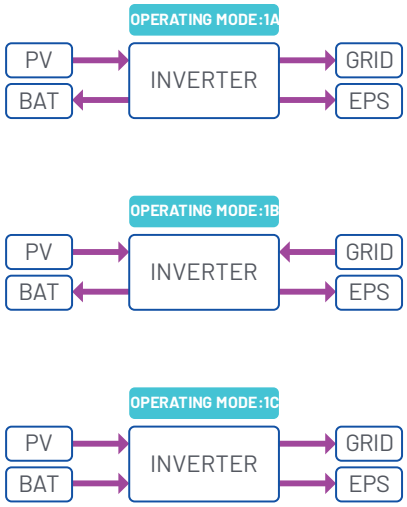
B. Solar provides power to the loads as first priority, if solar power is not sufficient to support all connected loads, battery energy will supplement the solar power supplied to the loads

C. Solar provides power to the loads as first priority, if solar energy and battery are not sufficient to power all connected loads, utility energy (grid) will supply power to the loads supplemented by the available solar energy.

2.When PV, Battery is available (the 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 provide power to charge the 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.



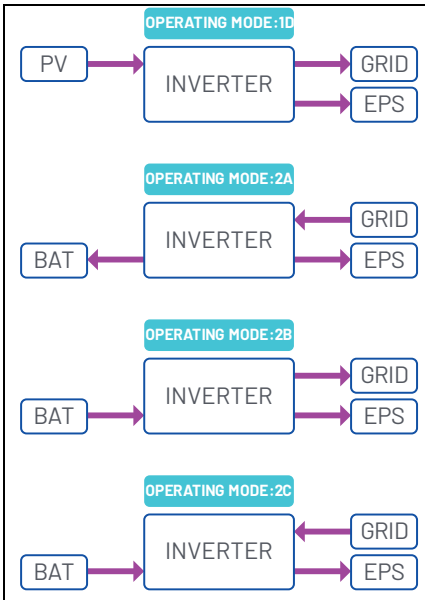
Operating Mode: Time of Use Scheduling (Peak shift)

1. When PV, Grid, and Battery are available:

A. During battery charge time, solar power will charge the battery as first priority. The excess power will supply the loads. If solar power is sufficient to supply loads and charge the battery, and if there's still some extra energy, then the excess power will feed the power to non-essential loads and the grid.

B. During battery charge time, solar energy will charge the battery as first priority, then the excess solar energy will supply power to loads. If solar energy is not sufficient to charge the battery and supply loads, the grid will supply the connected loads while available solar power charges the battery.

C. During battery discharge time, solar provides power to the loads as first priority, if solar power is sufficient to supply loads, and if there's still some extra power from solar, then the excess solar power and the battery will deliver the power to the non-essential loads or grid at the same time.



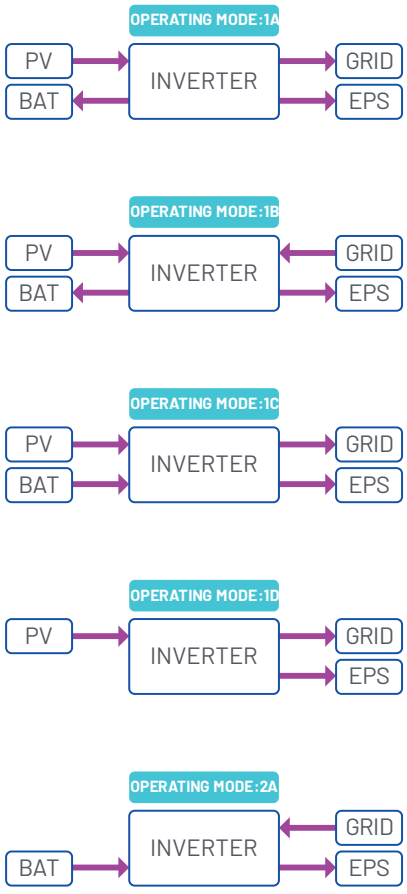
D. In the period of no charge or discharge, the solar power supplies load as first priority, and excess energy is fed to non-essential loads and the grid.

2. When Grid and Battery are available (PV is unavailable):

A. During battery charge time, the grid will charge the battery and supply power to the connected loads at the same time.

B. During battery discharge time, if load power is less than battery power, the battery will supply power to loads as first priority, the excess battery power will feed to non-essential loads and the grid.

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



Operating Mode: Time of Use Scheduling (load shift)

1. When PV, Grid, and Battery are available:

A. During battery charge time, solar power will charge the battery as first priority. The excess power will supply the loads. If solar power is sufficient to supply loads and charge the battery, and if there's still some extra energy, then the excess power will feed the power to non-essential loads and the grid.

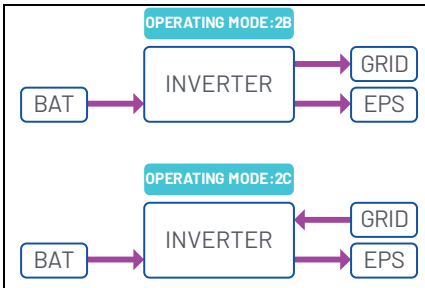
B. During battery charge time, solar energy will charge the battery as first priority, then the excess solar energy will supply power to loads. If solar energy is not sufficient to charge the battery and supply loads, the grid will supply the connected loads while available solar power charges the battery.

C. During battery discharge time, solar provides power to the loads as first priority, if solar power is sufficient to supply loads, and if there's still some extra power from solar, then the excess solar power and the battery will deliver the power to the non-essential loads or grid at the same time.

D. In the period of no charge or discharge, the solar power supplies loads as first priority, and excess energy is fed to non-essential loads and the grid.

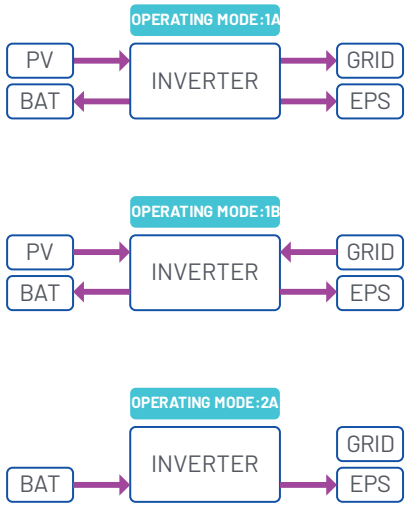
2. When Grid, Battery is available (PV is unavailable):

A. During battery charge time, the grid will charge the battery and supply power to the connected loads at the same time.



B. During battery discharge time, if load power is less than battery power, the battery will supply power to loads as first priority, the excess battery power will feed to non-essential loads and the grid.

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



Operating Mode: Bat priority

1. When PV, Grid, and Battery are available:

A. Solar energy will charge the 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 the grid.

B. Solar energy will charge the battery as first priority. If solar energy is insufficient to charge the battery and supply loads, the grid will supply power to loads.

2. When only the Grid and Battery are available（PV not available):

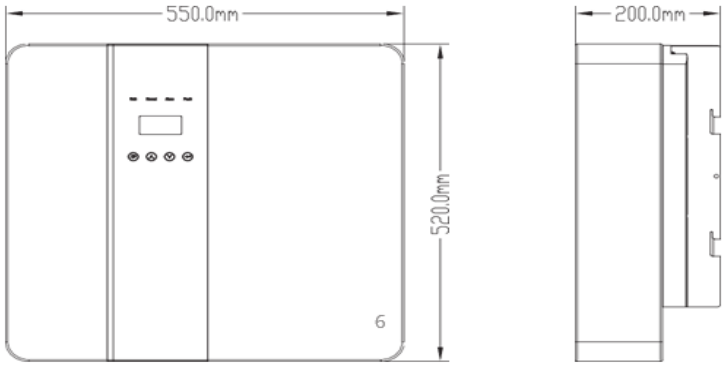
A. The grid will supply power to the load and charge the battery at the same time.

Note!
If the “anti-Reflux” (zero-export) function is set on the inverter, in all operating modes the system will not feed power to the grid, only to non-essential loads.

1.5 Dimensions

Principle dimensions are provided in Figure 1.3. The Encore 3K, Encore 3.6K and Encore 5K have the same casing size.

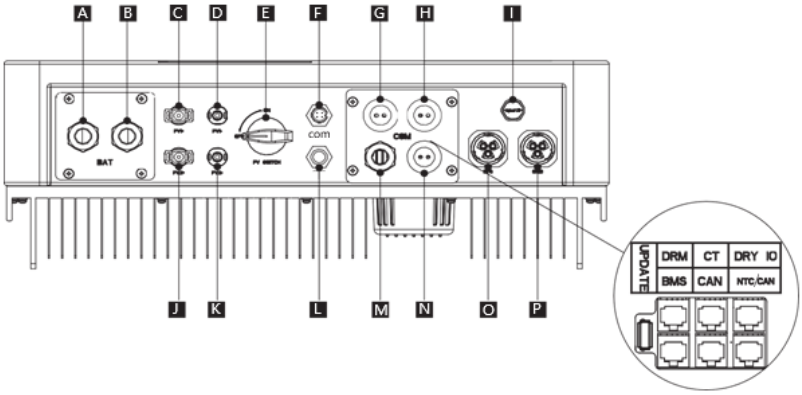
Figure 1.3 Principal Inverter Dimensions



2. Interface definition and Technical Data

2.1 Interface definition

Figure 2.1 Labelled View of Bottom of Inverter



OBJECT	DESCRIPTION	NOTES
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	The DRM port: Demand Response Mode, only to be used in some countries. The BMS port: BMS communication for lithium batteries.
H	Grid Current / DRY IO	DRY IO port: Reserved port
M	USB port for upgrading	The Update port: **For on-premises upgrades**
N	POWER CAN /LEAD-NTC	NTC/CAN port: The reserved port can be used as a parallel port
I	Pressure Valve	
O	EPS Output	
P	Grid Output	

Note!

1. The CT port: For external grid side CT to measure the grid input current.
2. CAN port: Parallel communication port.

2.2 Technical Data

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

Encore Single Phase Inverter Range

Technical Specification	Encore 3.6K	Encore 3K	Encore 5K
Input (PV)			
Max. power(kW)	4.6	4.6	7
Max. DC voltage(V)		550	
MPPT voltage range(V)		125~500	
Max.input current of single MPPT(A)		14/14	
MPPT tracker/strings		2/1	
AC output			
Rated output power(kVA)	3.68	3	5
Max. output current(A)	16	13	21.7
Grid voltage/range(V)		230/176~270	
Frequency (Hz)		50/60	
Displacement Power Factor		0.99lagging-0.99leading	
THDi		<2%	
Battery			
Battery voltage range(V)		40~58	
Max. charging voltage(V)		58	
Max. charge/discharge current(A)	95/76.6	95/62.2	95/104.2
Battery type		Lithium /Lead-acid	
Communication interface		CAN/RS485/WiFi/LAN/DRM	
EPS output			
Rated power (kVA)	3.68	3	5
Rated output voltage(V)		230	
Rated output current(A)	16	13	21.7
Rated frequency (Hz)		50/60	
Automatic switching time (ms)		<20	
THDv		<2%	
General data			
Battery chage/dischage efficiency	95.0%	95.0%	95.0%
DC Max. efficiency	97.6%	97.6%	97.6%
Europe efficiency	97.0%	97.0%	97.0%
MPPT efficiency		99.9%	
Ingress protection		IP65	
Noise level (dB)		<40	
Operation temperature(C)		-25~60(derating at 45)	
Cooling		Natural	
Storage/Operation Relative humidity		4 ~100%(non-condensing)	
Altitude(m)		<2,000	
Dimensions W * D * H (mm)		550*200*520	
Weight (kg)		25	
Night-time consumption(W)		<3	
Safety Compliance			
Safety Standard		IEC/EN62109-1/-2, IEC/EN62477-1, EN 62109-2	
EMC		IEC 61000-6-1/-2/-3/-4, IEC 61000-3-11, IEC61000-3-12	
Certificates		South Africa NRS, IEC 62109-1/-2, IEC 61000-6-1, IEC 61000-6-3	

2.3. 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
Overload protection	YES
Over temperature protection	YES
Max. output fault current	55A
Max. output over current	28.7A

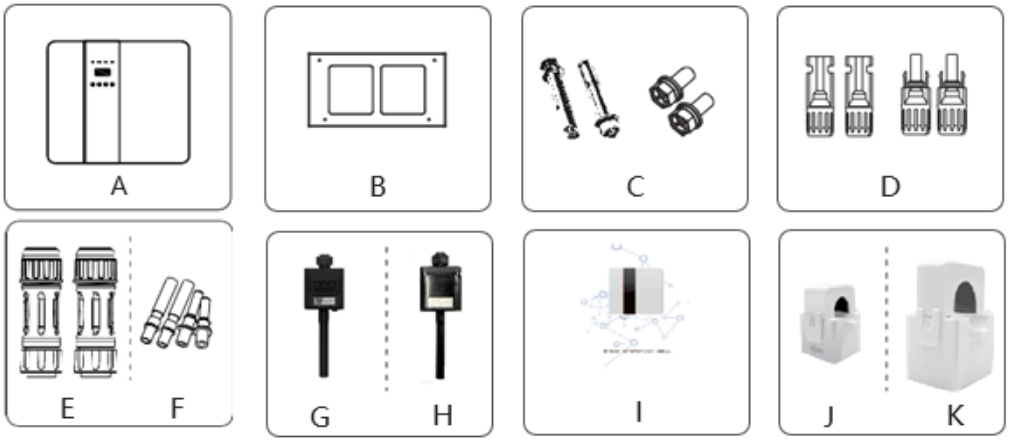
3. Installation

3.1 Check for Physical Damage

Ensure that the inverter was not damaged during transportation. If there is any visible damage, please contact your supplier/installer immediately.

3.2 Packing List

Open the package and take out the product, please check the accessories first. The packing list is shown below.



Object	Description
A	Inverter
B	Bracket
C	Expansion screws and pan-head screws
D	PV connectors (2*positive, 2*negative)
E	AC connectors
F	PV pin connectors (2*positive, 2*negative)
G	Wifi module (standard supply)
H	GPRS module (optional accessory)
I	User manual
J	CT (maximum range is 90A)
K	CT (optional accessory, maximum range is 200A. Use where multiple inverters are connected in parallel - System Diagram 2.)

3.3 Tools required for installation.

Installation tools: Crimping pliers for PV pin connectors, RJ45 crimping tool, screwdrivers, masonry drill, spanners, sockets, etc.

3.4 Mounting

► Space Requirement

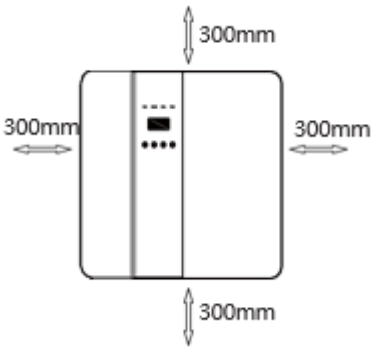


Table Available Space Size

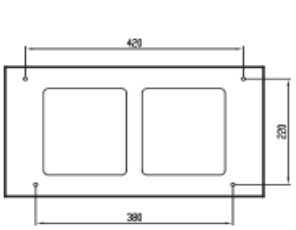
Position	Min.size
Left	300mm
Right	300mm
Top	300mm
Bottom	300mm
Front	300mm

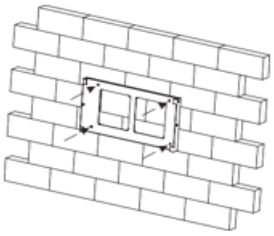
Step 1: Screw the wall bracket on the wall.

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

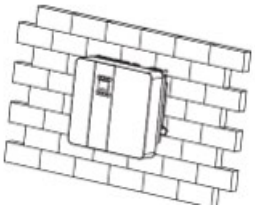
1.2 Drill holes with the masonry drill, make sure the holes are deep enough (at least 60mm) to support the inverter.

1.3 Install the wall plugs in the holes and tighten them. Then install the wall bracket with the wall plug screws.



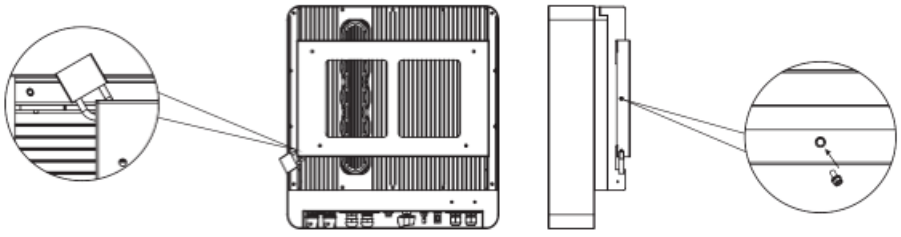


Step 2: Place the inverter on the wall-mounted bracket by holding the handles on the sides.



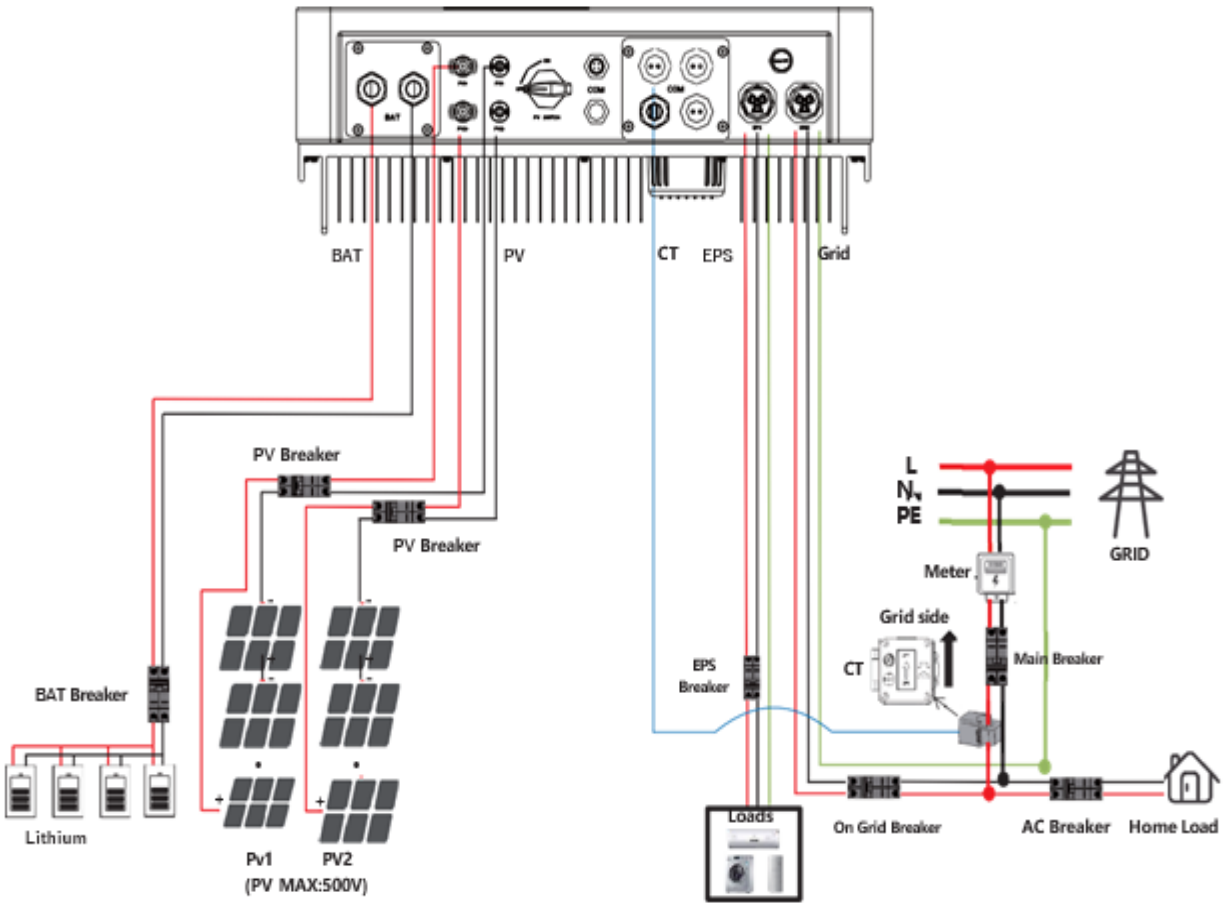
Step 3: Tighten the fixing screws on both sides of the inverter.

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



4. Electrical Connection

► Electrical connection diagram



4.1 Grid connection and EPS connection

The Encore 3K and Encore 5K inverters are designed for a single-phase grid connection. The voltage is 230V, frequency is 50Hz.

Table 1 Cable and Circuit Breaker recommended

Model	Pulse 3K	Pulse 5K
AC Cable	3 core 4mm2	3 core 6mm2
Circuit breaker	20A	32A

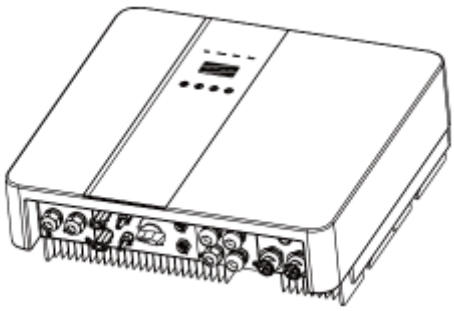
A circuit breaker should be installed between the inverter and grid, and between the load and inverter.

Step1. Check the grid voltage.

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

1.2 Disconnect the premises distribution board from all the phases and secure against inadvertent re-connection.

Step2. Remove the waterproof lid from the grid plug on the inverter.



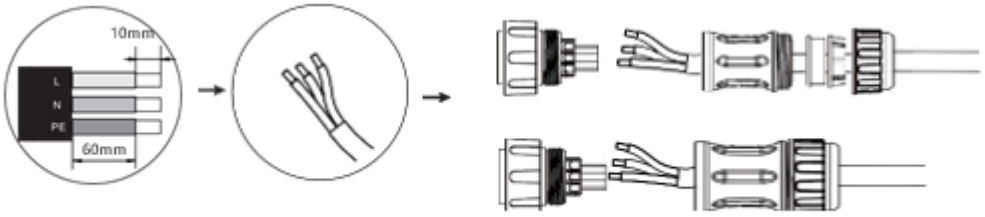
Step3. Make AC Supply and EPS wires.

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

3.2 Strip about 60mm of the outer insulation to expose the three wires and remove 10mm of insulation from the end of each wire.

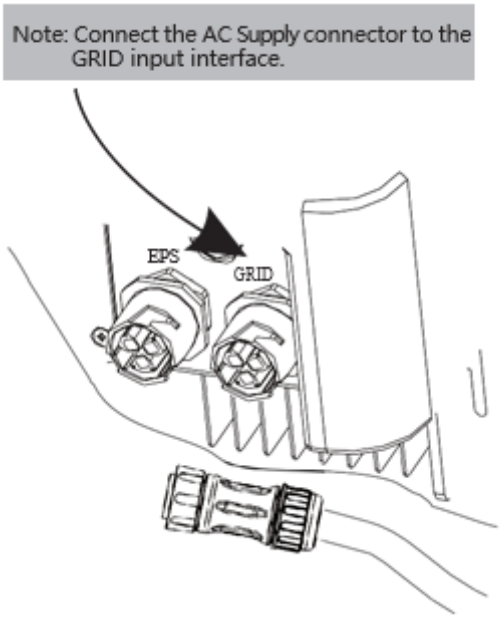
3.3 Separate the gland section of the AC plug from the main terminal housing and insert stripped L, N, and PE wires through the gland and attach to AC plug terminals according to labelling and then tighten the screws with an Allen key.

3.4 Attach the gland section to the terminal housing section and tighten the gland nut.



Step4. Connect the AC connector to the GRID port of the inverter and tighten the retaining nut. Connect the LOAD connector to the EPS port of the inverter and tighten the screw cap.

Note: Connect the AC Supply connector to the GRID input interface



Note: After connecting the grid cable, connect the CT to the L wire with the CT arrow towards the grid side.

4.2 PV connection

The Encore 3K and Encore 5K inverters can accept two-panel strings.

The open-circuit voltage of module arrays connected in series should be <Max. DC input voltage; operating voltage must be within the MPPT voltage range.

Max DC Voltage Limitation

Model	Encore 3K and Encore 5K
Max. DC Voltage (V)	550
MPPT Voltage Range (V)	125-500

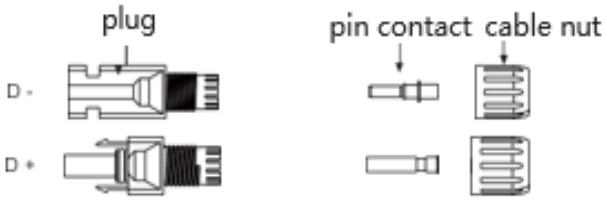
Warning!

- PV module voltage can be dangerous, comply with safety procedures and practices when connecting.
- Do not connect either PV positive or negative to ground!

Connection Steps:

Step1. Checking the PV module to ensure PV is in an open circuit state and ensure the PV+ and PV- ports of the PV string are correct.

Step2. Separating the DC connector.

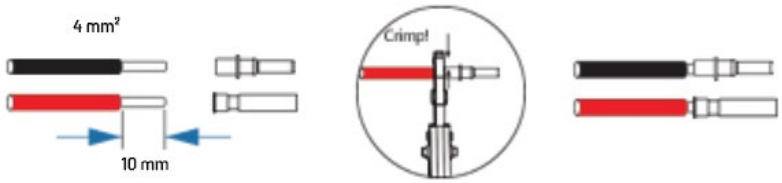


Step3. Wiring

3.1 Use a 4mm² PV cable to connect to the crimp terminal.

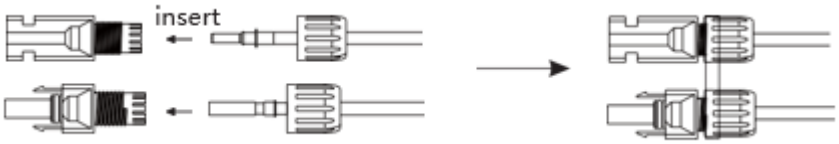
3.2 Remove 10mm of insulation from the end of the wire.

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

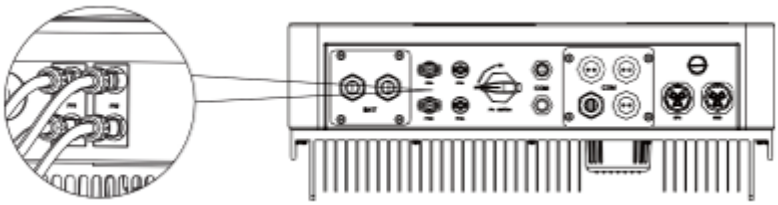


Step4. Insert pin contact through the cable nut to assemble into the back of the male or female plug.

When you feel or hear a “click” sound the pin contact assembly is seated correctly.



Step5. Plug the PV connector into the corresponding PV connector on the inverter.



4.3 Battery Connection

► Note

1. Before choosing a battery, please note the maximum voltage of the battery cannot exceed 59V and the nominal voltage of the battery should be 48V-52V. The selected battery must be compatible with the CAN communication interface and must be approved by Freedom Won for operation with the Encore inverters. Refer to the Freedom Won 52V batteries (LiTE Home, Marine and Business 52V models, and eTower), all of which are compatible with Encore inverters.

2. Before connecting to the battery, please install a DC (125A) breaker or fuse to make sure the inverter can be securely disconnected during maintenance. Note: when using Freedom Won LiTE batteries this external breaker or fuse is not required owing to the DC breaker built into these battery models.

3. The connecting cable between the battery and the inverter shall be at least 25mm². For Freedom Won batteries, use the cable provided with the battery.

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:

Step 1: Strip the battery cables cable back to 15mm or the appropriate length to suit the terminal. Use red cable for positive and black for negative (or similar suitable colour coding)

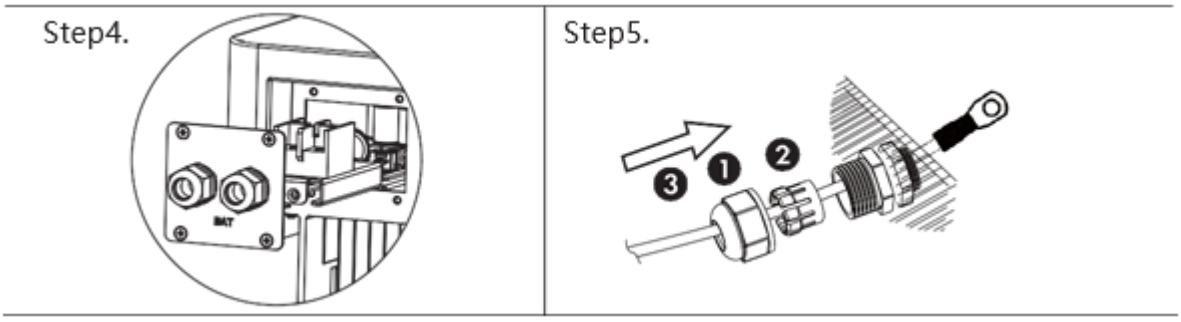
Step 2: Select two crimp ring terminals to suit M6 studs and apply heat shrink to the area shown in solid black below.

Step 3: Insert the cable into the ring terminal and clamp it with a crimping clamp.

Step1,2,3.

Step 4: Remove the waterproof cover plate.

Step 5: Disassemble the waterproof connector and pass the cable through the waterproof connector.



Step 6: Connect the cable to the terminal of the inverter.

Step 7: Assemble waterproof connectors and waterproof covers plate.

Note!

- Positive and negative cables must not be reversed!
- The positive pole on the left and the negative pole on the right.
- For multiple battery cable connections use a combiner busbar box to combine all battery cables and run one suitably sized cable to each input on the inverter.

4.4 Communication Interface Definition

► BMS PIN Definition

The communication interface between the inverter and battery is RS485 or CAN with an RJ45 connector. All Freedom Won batteries employ CAN for this function. The wiring sequence of the RJ45 plug conforms to the 568B standard: orange-white, orange, green-white, blue, blue-white, green, brown-white, and brown. Note that the Freedom Won LiTE range requires a special cable because these batteries use Pin 7 for CANH and Pin 8 for CANL on the battery CAN plugs.

	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

Reserved dry contact interface of the inverter.

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

► DRM Connection

DRM is provided to support several demand response modes by emitting control signals as below.
Note: Only PIN6 (DRM0) is available now, and other PIN functions are being developed.

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

4.5 WiFi Connection

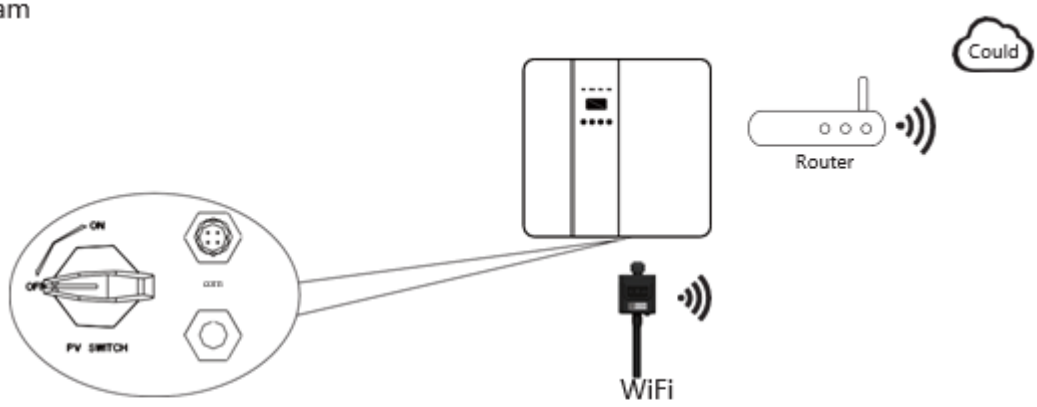
A WiFi dongle is supplied standard with the Encore inverters, which can collect data from the inverter and transmit it to a monitoring website via Wi-Fi.

Step 1: Plug the Wi-Fi dongle into the “COM” port at the bottom of the inverter.

Step 2: Establish a connection between the inverter and router.

Step 3: Create a user account online. (Please check the Wi-Fi user manual for more details).

► Diagram



COM

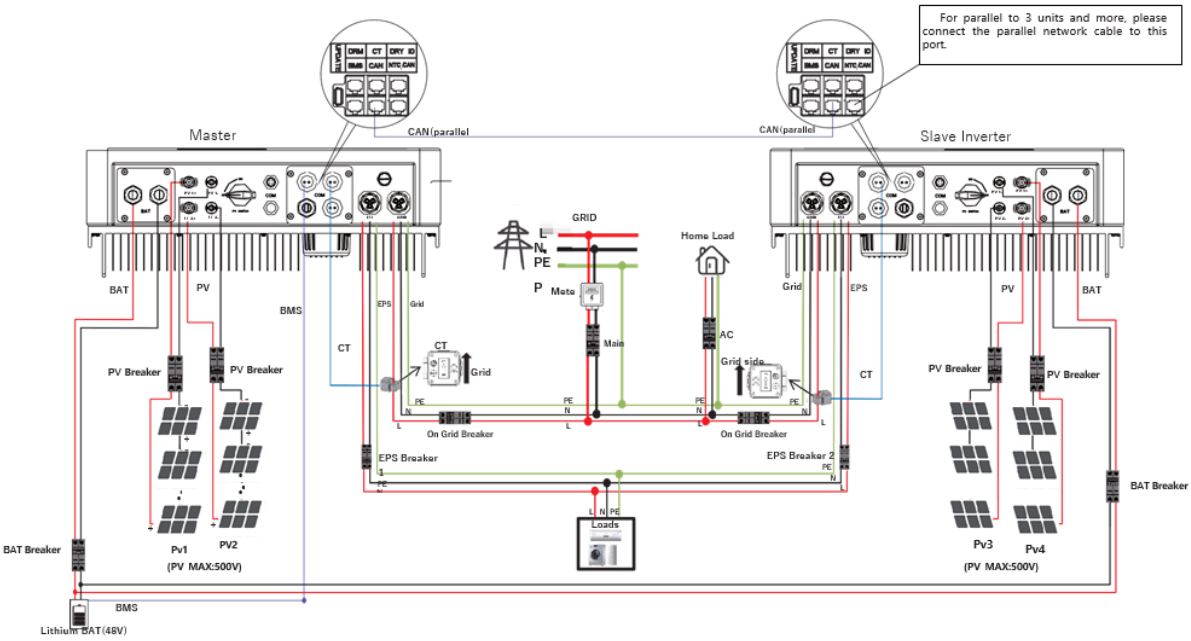
1	2	3	4
+5V	RS485_A	RS485_B	GND

4.6 Inverter Parallel Configuration Guide

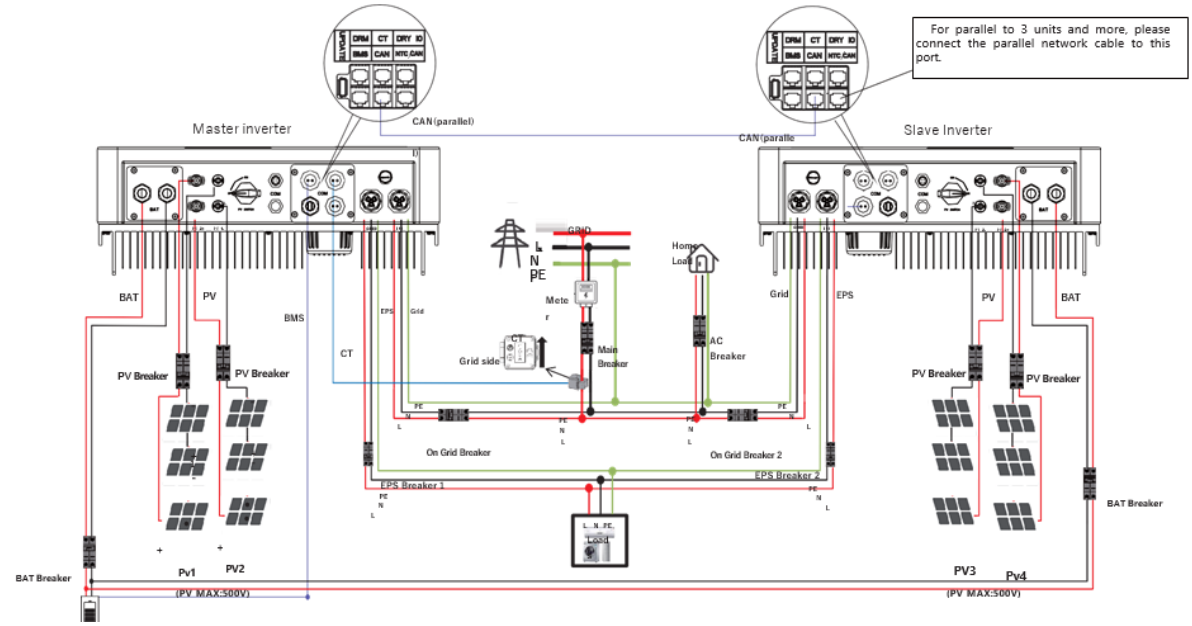
4.6.1 Parallel System Diagram

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

Parallel System Diagram 1（Independent CT connection Method, Default connection method）



Parallel System Diagram 2 （Common CT connection Method）



Note! If using the Common CT connection Method, please contact your installer 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 measure grid current.
4. CAN port: Parallel port.
5. NTC/CAN port: The reserved port can be used as a parallel port.

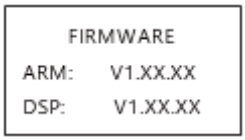
For parallel communication, CAT 5 cables are required. The units should be connected in a “daisy chain”.

When using a common DC bus battery connection arrangement, the BMS cable from the master battery needs to be connected to the master unit. The inverter shares the BMS information by an inter-unit parallel communication cable.

Note: Freedom Won LiTE batteries automatically select the master battery.

4.6.2 Parallel Operation Notes

1) Make sure all the units in parallel are with the same software version. USER->INQUIRE->FIRMWARE



2) Connect loads of the two inverters 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 the user wants to add a grid/load ac breaker, please make sure the lines are paralleled/joined before connecting to the breaker.

3) Make sure the CT limiter sensor is installed properly.

4) Please note that the slave unit will automatically operate in the same work mode as the master unit.

4.6.3 Parallel System Setting

The parallel setting page can be visited in the following steps on the screen: USER->1. SETUP->PASSORD CHECK->15.parallel

9 . PARALLEL EN, Enable/Disable the parallel function.

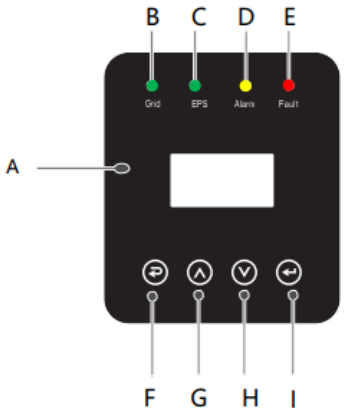
Interface	Description
Parallel	This interface shows the parallel settings.
NUM	1. The total number of inverters connected in the system（up to four parallel machines are supported）.
MASTER/SLAVE	2. In a parallel system, the master unit broadcasts the BMS and other information to the slaves. Make sure only one unit is configured as master.
ADDRESS	3. Local unit addresses (1-8) (cannot be duplicated).
COMMON BAT	4. Common battery DC bus for all inverters or independent battery bus per inverter.
COMMON CT	5. Common CT Enable (if using the Common CT connection Method, this feature needs to be enabled.)
PHASE A/B/C	6. The local phase of the unit for three-phase installation. (Reserved function)
DISCHARGE CURR	7. The total battery discharge current limit is only settable in the master unit in parallel mode.
CHARGE CURR	8. The total battery charge current limit is only settable in the master unit in parallel mode.
PARALLEL EN	9. Enable/Disable the parallel function.

Parallel Error information

Interface	Description
ERROR 11: parallel fail	A parallel 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.

5. LCD Interface and Setting

5.1 Control Panel

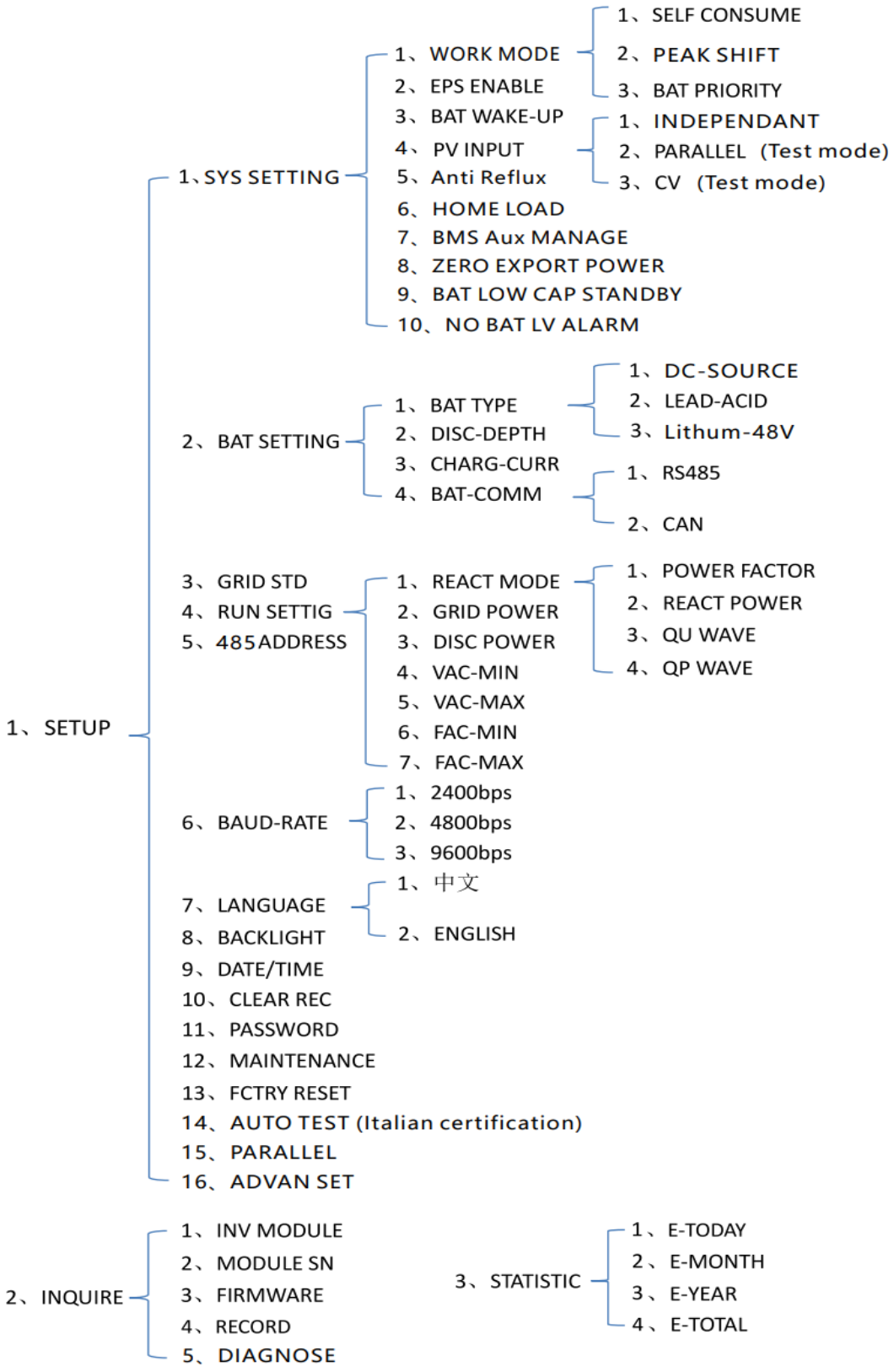


Object	Name	Description
A	LCD Screen	Display the information of the inverter.
B	Indicator LED	lit in green: The inverter is in grid mode. Off: The inverter is in not in grid mode.
C		lit in green: The inverter is in off-grid mode. Off: The inverter is in not in off-grid mode.
D		lit in Yellow: The inverter 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 Indication

	Grid (Green)	EPS (Green)	Alarm (Yellow)	Fault (Red)
Initialization	Off	Off	Off	Off
Stand-by	Off	Off	Off	Off
Off-Grid	Off	On	Off	Off
Bypass of Mains	Off	On	On	Off
Fault	Off	Off	Off	On

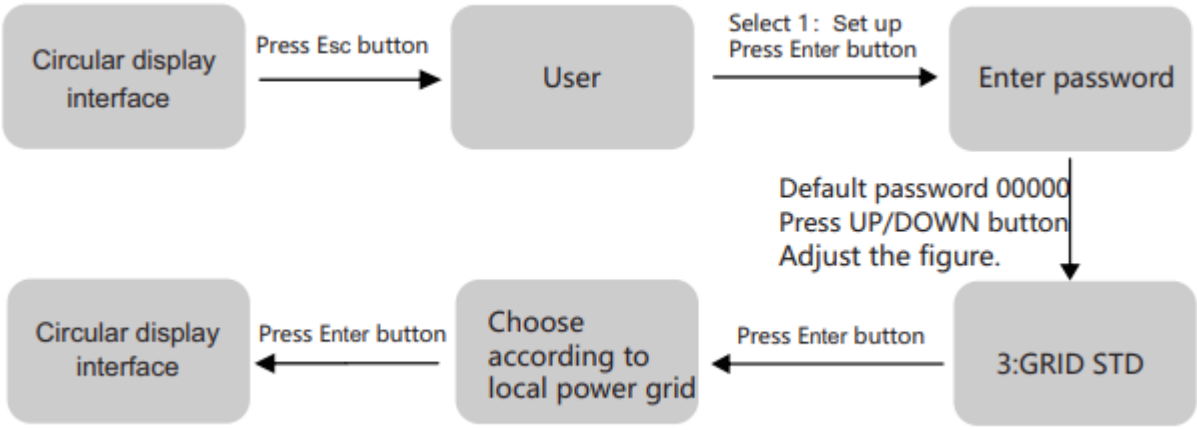
5.3 Instructions for the use of three modes



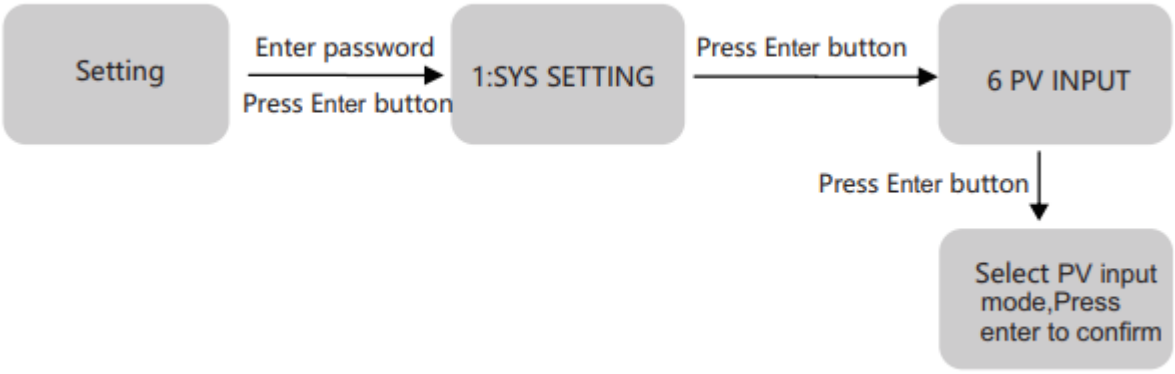
For example, before selecting the mode, you can set it up according to the local power grid,

PV input mode and battery type.

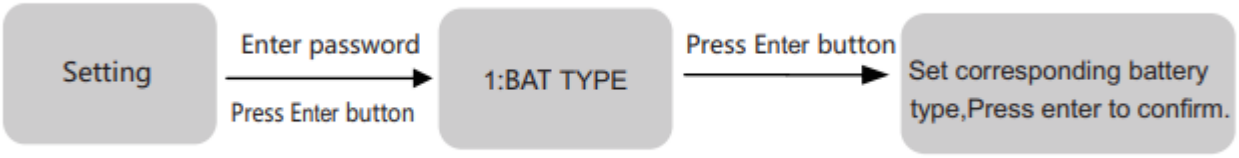
Power grid：



PV input mode：



Battery parameters:



5.4 LCD Interface

5.4.1 Error information

Interface	Description
ERROR NO. 02:BatDisconnect 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 cannot move to another page, you need to press Enter to unlock it first.

5.4.2 System setting1

Interface	Description
SYSTEM1 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 set. PV input mode: The display value is the setting value of the PV input type. Including INDEPENDENT, PARALLEL, and CV. Settings. Explanations are provided in section 5.5.4.4

5.4.3 System setting2

Interface	Description
SYSTEM2 BMS Com: CAN Anti-Reflux: DISA DOD: 80%	BMS Com: Battery Management System communication mode. Including CAN, and RS485. Anti-Reflux: Displays Whether Inverter isn't allowed to generate electricity to the Grid. Including DISABLE and 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
SYSTEM3 EPS ENABLE: ENAB	EPS ENABLE: When the Grid and PV are powered off, Enable the battery to supply power to the load, the default option is enable.

5.4.5 PV1 Input display interface

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

5.4.7 DC Voltage interface

Interface	Description
DC VOLTAGE BUS: 384V	BUS: Real-time voltage of the 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 (received from the BMS). C: Indicates that the battery will accept charge D: Indicates that the battery will accept discharge F: The battery requests a forced charge

5.4.9 Battery current interface

Interface	Description
BATTERY INFO TYPE: Lithium TEMP: 26℃ SOC: 30%	TYPE: Battery type: (lead acid, lithium battery) TEMP: Battery temperature. SOC: Percentage of battery 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 a parallel state and uses a 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 OUTPUT VOLT: 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℃ DCDC: 0℃ INSIDE: 0℃	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 turns into on-grid working mode. DCDC: Displays charging and discharging status information, including STANDBY, CHARGE, and DISCHARGE.

5.5 Settings

5.5.1 SETTINGS

Interface	Description
USER 1. SETUP 2. INQUIRE 3. STATISTIC	SETUP: Press Enter on the user settings interface. INQUIRE: Query machine model, serial number, and 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 to move the cursor backward.

5.5.3 Setup

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. 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 the ESC button to return to the user interface.

5.5.4 System setting

5.5.4.1 Interface

Interface	Description
SYS SETTING 1. WORK MODE 2. EPS ENABLE 3. BAT WAKE-UP 4. REMOTE CTRL 5. START DELAY 6. PV INPUT 7. Anti Reverse 8. HOME LOAD 9. BMS Aux MANAGE 10. Zero Export Power 11. BAT LOW CAP STANDBY	This interface is used to access system information. Press the Up/Down button to move the corresponding options. Press Enter to enter the selected menu. Press the ESC button to return to the setting interface.

5.5.4.1.1 Work mode

Interface	Description
WORK MODE 1. SELFCONSUME 2. PEAK SHIFT 3. BAT PRIORITY	This interface is used to select the working mode. Press the ESC button to return to the setting interface. (Refer to 3.3)

5.5.4.1.2 Peak shift work time

Interface	Description
WORK MODE 1. SELFCONSUME 2. PEAK SHIFT 3. BAT PRIORITY WORKTIME 1. TIME 1 2. TIME 2 3. TIME 3 CHAG START1 00:00 CHARGE END1 00:02 DISC START1 00:03	This interface is used to select the working mode. Press the ESC button to return to the setting interface. (Refer to 3.3). Select the peak clipping and valley filling mode, you also need to set the charge and discharge time. Three charging and discharging periods can be set. 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 a specific period conflicts with another time, the earliest time is used as the effective setting. If the three-time ranges do not conflict, the three-time range settings are executed in sequence.

DISCHA END1 23:59	This interface is used to adjust the time of peak load shifting. Press the Up/Down button to move the corresponding options. Press Enter to enter the selected menu. Press the 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, and the 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 to forcibly energize the relay, 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 stand-alone mode, PV power will be imbalanced.

5.5.4.5 Anti Reflux

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

5.5.4.6 HOME LOAD

Interface	Description
HOME LOAD 1. DISABLE 2. ENABLE	ENABLE: Statistics on the power consumption of grid-side 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 over-discharging the battery. The default option is disabled.

5.5.4.8 Zero Export Power

Interface	Description
Zero Export Power INPUT: +000W	Grid demand setpoint – used to ensure a positive draw always to ensure the hybrid inverter won't feed power to the grid, set it as +20w~100w. (-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 enable.

5.5.4.10 NO BAT LV ALARM

Interface	Description
NO BAT LV ALARM 1. DISABLE 2. ENABLE	ENABLE: When the battery voltage or SOC falls below the set value, the inverter will not display an alarm. The default option is disable.

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 the Up/Down button to move corresponding options; Press Enter button to enter the selected menu. Press the ESC button to return to the setting interface.

5.5.5.1.1 BAT TYPE

Interface	Description
BAT TYPE 1. DC-SOURCE 2. LEAD-ACID 3. Lithium	This interface is used to select battery types. Press the Up/Down button to move corresponding options; Press Enter button to enter the selected menu. Select the LEAD-ACID enter button to enter the 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 the 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 input value ranges from 40 to 58)
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 to) 1000) The battery capacity setting will affect the maximum charging current, for example, set 100Ah, the maximum charging current is 100A*0.2=20A

5.5.5.2 BAT-COMM

Interface	Description
BAT-COMM 1. RS485 2. CAN	This interface is used to select battery communication BMS type. Press the 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 the Grid standard. Press the 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: TSAIL—THAILAND 11:ZA—South Africa 12: CUSTOM—User defined 13: POL—Poland 14: EN50549 15: VDE4105 16: JPN—Japan 17: ITA—Italy

2.1.1 RUN SETTING

2.1.1.1 RUN SETTING

Interface	Description
RUN SETTING 1. REACT MODE 2. GRID POWER 3. DISC POWER 4. PV POWER 5. VAC-MIN 6. VAC-MAX 7. FAC-MIN 8. FAC-MAX 9. ACTIVE REP.	This interface is used to select the run setting. Press the 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, and QP WAVE. (For specific countries, 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 L0.80 and L0.99 or C0.8 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 the power percent of the grid.

5.5.7.4 DISCHARGE POWER

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

5.5.7.5 PV POWER

Interface	Description
PV PERCENT INPUT: 100%	The input value is the power percent of PV.

5.5.7.6 VAC-MIN

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

5.5.7.7 VAC-MAX

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

5.5.7.8 FAC-MIN

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

5.5.7.9 FAC-MAX

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

5.5.7.10 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: The 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: The 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, the 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 detection (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 detection and the load will stop working.

5.5.8 485 Address

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

5.5.9 485 BAUD RATE

Interface	Description
SELECT	This interface is used to select a 485 baud rate.

1.2400 bps 2.4800 bps 3.9600 bps	

5.5.11 BACKLIGHT

Interface	Description
LIGHT TIME INPUT: 20 UNIT: SEC	This interface is used to set the backlight on time after a button is pressed.

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 a 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 a password.

5.5.15 MAINTENANCE

Interface	Description
5.5.15 MAINTENANCE PASSWORD INPUT:	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 advanced mode allows management of flexible loads and time-of-use billing. ADVAN SET: Advanced settings 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 modes available: Sell First, and 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 the grid. If the time of use is enabled, the battery power can also be sold to the grid. SFC. Sell EN: Self-consume mode, 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 be used to charge the battery, and then redundant power will feed to the grid（. See 1.4 Work Modes for details） SFC. Sell Dis: Self-consume mode electricity selling disabled. 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 the 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 TOU Set Start: 00:00 End: 00:00 Power: 00:00 Soc: 00:00	There are also some attributes of these modes: Global Grid Charge Enable, Time-of-use Enable, and PV Charge Only. Global Grid Charge Enable: It is a high-level control attribute of grid charge enable. If the time of use function is disabled, this attribute is used to judge whether or not to charge the battery by the grid. If the time of use function is enabled, the battery can be charged by the grid only when the time slot grid charge attribute is enabled. Time-of-use Enable: 6 slots can be programmed. If grid charge is enabled, 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 is enabled, the battery will discharge to target SOC at specific battery power attribute value. PV Charge Only: If the user doesn't want to use the grid to charge the battery at 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.

2.1 INQUIRE

2.1.1 INQUIRE

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

5.6.1.1 INV MODULE

Interface	Description
MODEL 5K	This interface shows an inverter model.

5.6.2 MODULE SN

Interface	Description
S / N GUID: XXXXXXXX XXXXXXXXXXXXXX SN:FXXXXXXXXXXX	This interface shows the module SN.

5.6.3 FIRMWARE

Interface	Description
FIRMWARE ARM: V1.XX.XX DSP: DSP: V1.XX.XX	This interface shows the Software version.

5.6.4 RUNNING RECORDS

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

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 shows inverter operation statistics. 1. Displays statistics for the day (KWH). 2. Displays statistics for the month (KWH). 3. Displays statistics for the year (KWH). 4. Displays statistics of the inverter (KWH).

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

1. If the inverter shuts down before 24:00 on that day, the day's statistics will not be stored

5.8 Autotest Fast

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
AutoTest OK!	
↓	
59.S1 :228V 902ms	
↑↓	Press the up/down button to page through the test page
59. S2 :229V 204ms	
↑↓	Press the up/down button to page through the test page
27. S1 :228jV 408ms	
↑↓	Press the up/down button to page through the test page
27. S2 :227V 205ms	
↑↓	Press the up/down button to page through the test page
81>. S1 49. 9Hz 103ms	
↑↓	Press the up/down button to page through the test page
81>. S2 49. 9Hz 107ms	

↑↓	Press the up/down button to page through the test page
81<. S1 50. 0Hz 105ms	
↑↓	Press the up/down button to page through the test page
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	Explanation	Solutions
Dischg Over Cur	00	Battery discharge over current. When the battery is loaded, the load is too large.	(1) No intervention is required to restart, wait one minute for the inverter to restart. (2) Check whether the load complies with the specification. (3) Remove some loads to prevent a recurrence.
Overload	01	The load power is greater than the combined power available from PV and BAT	(1) Check whether the load complies with the maximum power of the inverter. (2) Remove some loads and wait for the inverter to restart. (3) Contact customer service if the error warning continues.
Bat Disconnect	02	BatteryDisconnect.(Battery voltage not identified)	(1) Check whether the battery is connected. (2) Check if the battery wiring port is open-circuited. (3) Contact customer service if the 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 the Inverter's maximum voltage.	(1) Verify the battery voltage is within operating range. (2) Restart the inverter and wait until it functions.
Grid over vol	06	The grid voltage is abnormal	(1) Check if the grid is abnormal.
Grid over vol	07		

			(2) Restart the inverter and wait until it functions normally. (3) Contact customer service if the error warning continues.
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 the error warning continues.
	09		
Gfci over	10	Inverter GFCI exceeds the standard.	(1) Check the PV string for direct or indirect grounding phenomena. (2) Check the peripherals of the inverter for current leakage. (3) Contact the local inverter customer service if the 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 the 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 the 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 the 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 error	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	Battery temperature is higher than the allowed value.	Disconnect the battery and reconnect it after an hour.
Bat UnderTemp	24	Battery temperature is lower than the allowed value.	(1) Check the ambient temperature near the battery to see if it meets the specifications
BMS comm.fail	27	Communication between the lithium battery and inverter is abnormal or not in communication.	(1) Check the cable, crystal, and 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 the 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 and PV wire. (2) Contact customer service if the 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 the error warning continues.
Inv soft fail	33		
BUS short	34		
Inv short	35		
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 iso 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 the 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 the error warning continues.
Grid Relay Fault	39	The inverter may be damaged.	(1) Restart the inverter and wait until it functions normally. (2) Contact customer service if the error warning continues.
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 your installer.