X3-Retro Fit User Manual

8.0kW - 10.0kW

EN

Solax Power Network Technology(Zhe jiang) Co,. Ltd.

No.288 Shizhu Road, Tonglu Economic Development Zone,
Tonglu City, Zhejiang province, China.

Tel: +86 0571-56260011
E-mail: info@solaxpower.com

614.00455.01

Copyright Declaration

The copyright of this manual belongs to Solax Power Network Technology(Zhe jiang) Co,. Ltd.. Any corporation or individual should not plagiarize, partitially or fully copy (including software,etc.), and no reproduction or distribution of it in any form or by any means. All rights reserved. SolaX Power Network Technology (Zhe jiang) Co.,Ltd. (SolaX Power Co.,Ltd.). reserves

www.solaxpower.com

Contents

1. Note on this Manual 03
1.1 Scope of Validity 03
1.2 Target Group 03
1.3 Symbols Used 03

2. Safety 04
2.1 Important Safety Instructions 04
2.2 Explanation of Symbols 08
2.3 CE Directives 09

3. Introduction 10
3.1 Basic Features 10
3.2 Work Modes 12
3.3 Dimension 13
3.4 Terminals of Inverter 14

4. Technical Data 15
4.1 AC output/input(apply to version E, C) 15
4.2 Internal Charger(apply to version E, C) 15
4.3 Efficiency, Safety and Protection(apply to version E, C) 16
4.4 EPS output (apply to version E only) 16
4.5 General Data 17

5. Installation 18
5.1 Check for Physical Damage 18
5.2 Packing List 18
5.3 Mounting 19

6. Electrical Connection 22
6.1 Grid Connection 22
6.2 EPS Connection(apply to E Version) 24
6.3 On-Grid Parallel Connection 28
6.4 Battery Connection 32

6.5 Earth Connection(mandatory) 35
6.6 Meter Connection 36
6.7 RS485Connection 38
6.8 DRM Connection 39
6.9 LAN Connection 40
6.10 WiFi Connection(optional) 41
6.11 Inverter Operation 42

7. Firmware Upgrading 44

8. Setting 47
8.1 Control Panel 47
8.2 Menu Structure 48
8.3 LCD Operation 49

9. Troubleshooting 72
9.1 Troubleshooting 72
9.2 Routine Maintenance 76

10. Decommissioning 77
10.1 Dismantling the Inverter 77
10.2 Packaging 77
10.3 Storage and Transportation 77

1. Notes on this Manual

1.1 Scope of Validity

This manual is an integral part of X3-Retro Fit, It describes the assembly, installation, commissioning, maintenance and failure of the product. Please read it carefully before operating.

X3-Fit-8.0E	**X3-Fit-10.0E**
X3-Fit-8.0C	**X3-Fit-10.0C**

Note: **"8.0"** means 8.0kW.
"E" means "EPS function" will be available with an external changeover device installed.
"C" means without"EPS function".
Store this manual where it can be accessible at all times.

1.2 Target Group

This manual is for qualified electricians. The tasks described in this manual only can be performed by qualified electricians.

1.3 Symbols Used

The following types of safety instructions and general information appear in this document as described below:

Danger!
"Danger" indicates a hazardous situation which, if not avoided, will result in death or serious injury.

Warning!
"Warning" indicates a hazardous situation which, if not avoided, could result in death or serious injury.

Caution!
"Caution" indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

Note!
"Note" provides tips that are valuable for the optimal operation of our product.

2. Safety

2.1 Important Safety Instructions

Danger!
Danger to life due to high voltage in the inverter!
- All work must be carried out by qualified electrician.
- The appliance is not to be used by children or persons with reduced 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.

Caution!
Possible damage to health as a result of the effects of radiation!
- Do not stay closer than 20 cm to inverter for any length of time.

Warning !
- Authorized service personnel must disconnect both AC power from inverter before attempting any maintenance or cleaning or working on any circuits connected to inverter.

Warning !
Do not operate the inverter when the device is running.

Warning !
Risk of electric shock!

- Prior to the application, please read this section carefully to ensure correct and safe application. Please keep the user manual properly.
- Accesories only together with the inverter shipment are recommanded here. Otherwise may result in a risk of fire, electric shock, or injury to person.
- 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.
- The unit contains capacitors that remain charged to a potentially lethal voltage after the MAINS and battery have 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 or Battery cables when power is applied. After switching off the battery and Mains, always wait for 5 minutes to let the intermediate circuit capacitors discharge before disconnecting battery plugs and MAINS cables.
- 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 before hand since the capacitors require time to sufficiently discharge!
- Measure the voltage between terminals UDC+ and UDC- with a multi-meter (impedance at least 1Mohm, voltage must be less than 35VDC) to ensure that the unit is discharged before starting to do any operation inside the device.

- Lightning will cause a damage either from a direct strike or from surges due to a nearby strike.

- Specialists in lightning protection should be consulted during the end use application.
- Using appropriate external lightning protection, the effect of a direct lightning strike into a building can be mitigated in a controlled way, and the lightning current can be discharged into the ground.

- Installation of SPDs to protect the inverter against mechanical damage and excessive stress include a surge arrester in case of a building with external lightning protection system (LPS) when separation distance is kept.

- To protect the AC system, surge suppression devices (SPD type2) should be fitted at the main incoming point of AC supply (at the consumer's cutout), located between the inverter and the meter/distribution system; SPD (test impulse D1) for signal line according to EN 61632-1.

▶ Anti-Islanding Effect

Islanding effect is a special phenomenon that grid-connected system still supply power to the nearby grid when the voltage loss is happened in the power system. It is dangerous for maintenance personnel and the public.
X3-Retro Fit seires inverter provide Active Frequency Drift(AFD) to prevent islanding effect.

▶ PE Connection and Leakage Current

- All inverters incorporate a certified internal Residual Current Device(RCD) in order to protect against possible electrocution and fire hazard in case of a malfunction in the PV array, cables or inverter.There are 2 trip thresholds for the RCD as required for certification (IEC 62109-2:2011). The default value for electrocution protection is 30mA,and for slow rising current is 300mA.
- If an external RCD is required by local regulations,check which type of RCD is required for relevant electric code. It recommends using a type-A RCD. The recommended RCD values is 100mA or 300mA unless a lower value is required by the specific local electric codes. When required by local regulations, the use of an RCD type B is permitted.

Warning !
High leakage current!
Earth shall be connected before connecting to any power.

- Incorrect grounding can cause physical injury, death or equipment malfunction and increase electromagnetic.
- Make sure that grounding conductor is adequately sized as required by safety regulations.
- Do not connect the ground terminals of the unit in series in case of a multiple installation. This product can cause current with a d.c component, Where a residual current operated protective (RCD) or monitoring (RCM) device is used for protection in case of direct or indirect contact, only an RCD or RCM of type B is allowed on the supply side of this product.

For United Kingdom

- The installation that connects the equipment to the supply terminals shall comply with the requirements of BS 7671.
- No protection settings can be altered.
- User shall ensure that equipment is so installed, designed and operated to maintain at all times compliance with the requirements of ESQCR22(1)(a).

For Australia and New Zealand

- Electrical installation and maintenance shall be conducted by licensed electrician and shall comply with Australia National Wiring Rules.

▶ Battery Safety Instructions

SolaX X3-Retro Fit series inverter can only work with high voltage battery, for the specific parameters such as battery type, nominal voltage and nominal capacity etc., please refer to section 4.2.
As accumulator batteries may contain potential electric shock and short-circuit current danger, to avoid accidents that might be thus resulted, the following warnings should be observed during battery replacement:

1: Do not wear watches, rings or similar metallic items.
2: Use insulated tools.
3: Put on rubber shoes and gloves.
4: Do not place metallic tools and similar metallic parts on the batteries.
5: Switch off load connected to the batteries before dismantling battery connection terminals.
6: Only qualified personnel with proper knowledge can carry out the maintenance of batteries.

2.2 Explanation of Symbols

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

• Symbols on the Inverter

Symbol	Explanation
	Operating Display.
	Battery status.
	An error has occurred, please inform your installer immediately.

• Symbols on the Type Label

Symbol	Explanation
	CE mark. The inverter complies with the requirements of the applicable CE guildlines.
	TUV certified.
	RCM remark.
	SAA certification.
	Beware of hot surface. The inverter can become hot during operation. Avoid contact during operation.
	Danger of high voltages. Danger to life due to high voltages in the inverter!
	Danger. Risk of electric shock!
	Observe enclosed documentation.

	The inverter can not be disposed together with the household waste. Disposal information can be found in the enclosed documentation.
	Do not operate this inverter until it is isolated from battery and mains.
	Danger to life due to high voltage. There is residual voltage existing in the inverter after powering off, which needs 5 min to discharge. • Wait 5 min before you open the upper lid.

2.3 CE Directives

This chapter follows the requirements of the European low voltage directives, which contains the safety instructions and conditions of acceptability for the consumer's system, which anyone must follow when installing, operating and servicing the unit. If ignored, physical injury or death may follow, or damage may occur to the unit. Read this instruction before you work on the unit. If you are unable to understand the dangers, warnings, cautions or instructions, please contact an authorized service dealer before installing, operating and servicing the unit. The grid connected inverter meets the requirement stipulated in Low Voltage Directive (LVD) 2014/35/EU and Electromagnetic Compatibility (EMC) Directive 2014/30/EU. The unit is based on: EN 62109-1:2010; EN 62109-2:2011; IEC 62109-1(ed.1); IEC62109-2(ed.1); EN 61000-6-3:2007+A:2011; EN 61000-6-1:2007; EN 61000-6 -2:2005.The grid connected inverter from the factory will be ready for connecting to devices and the mains, and the unit shall be installed in accordance with national wiring regulations. Compliance with safety regulations depends upon installing and configuring system correctly, including the use of the specified wires and so on. The system must be installed only by professional installers who are familiar with requirements for safety and EMC. The installer is responsible for ensuring that the whole system complies with all the relevant laws in the country where the unit is installed.The individual subassembly of the system shall be interconnected by means of the wiring methods outlined in national/international regulations such as the national electric code (NFPA) No.70 or VDE regulation 0107.

3. Introduction

3.1 Basic Features

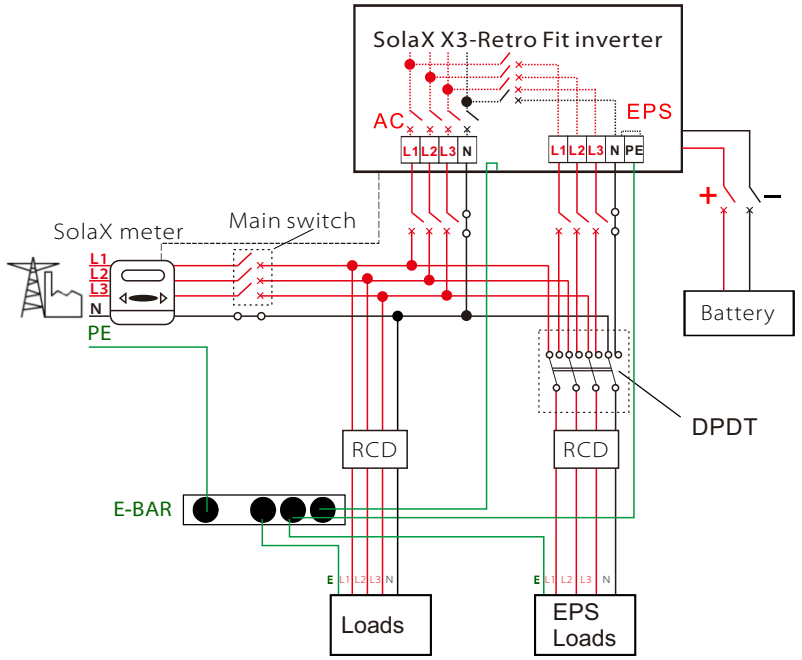
X3-Retro Fit is a high-quality inverter which can store energy into battery. The inverter can be used to optimize self consumption, store energy in the battery for future use or feed-in to the public grid. Work mode depends on the battery and user's preference. It can provide power for emergency use during power cut by using the energy from battery.

▶ System Diagram

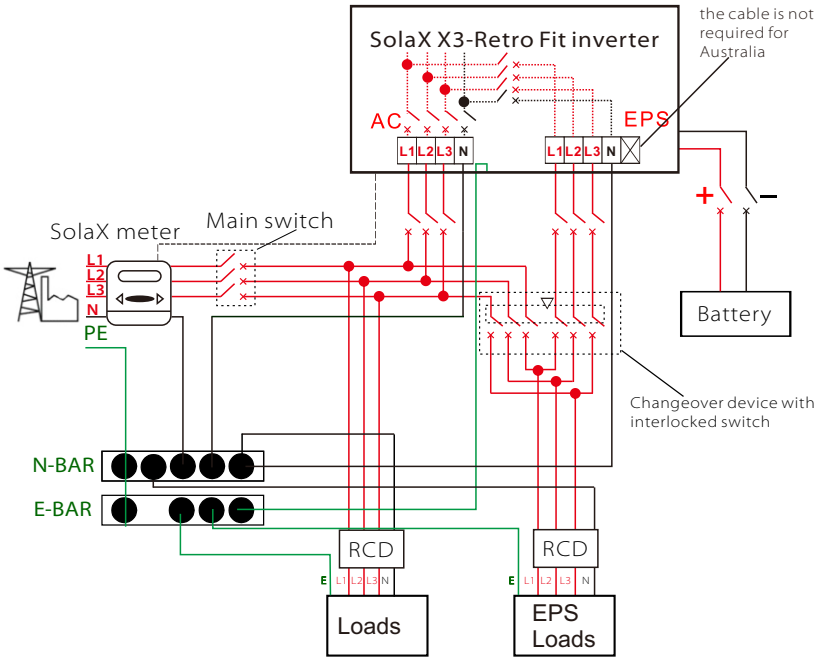
E Version applies to emergency use with external changeover device installed during power cut.

E version is designed with two versions for customer to choose based on the local rules.

Digram A applies to the wiring rules that requires Live lines and Neutral line of EPS must be disconnected with the Live line and Neutral line of grid. (applies to most countries)



Digram B applies to the wiring rules which requires Neutral line of alternative supply must not be isolated or switched. (applies to wiring rules AS/NZS_3000:2012 for Australia and New Zealand)

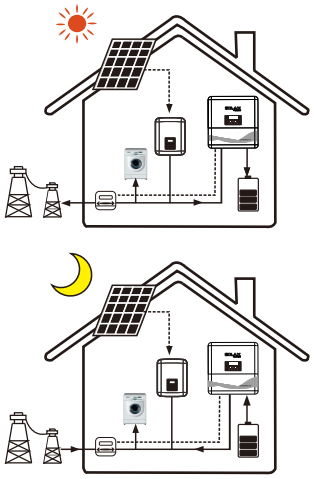


Note!

- Please be careful of adding the home loads, and make sure it's within the "EPS output rating" under EPS mode, otherwise the inverter will stop with an "overload fault" warning.
- Please confirm with the local grid supplied whether there is any special regulation for connecting to the grid.

3.2 Work Modes

X3-Retro Fit Series inverter provides multiple work modes based on different requirements.

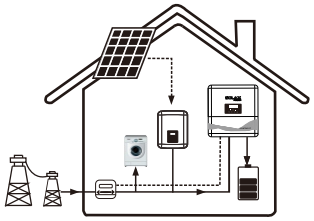


Work modes: **Self-use**

Priority: load>battery>grid
This mode applies the area that has low feed-in tariff and high electricity price.

·In the case of the external generator, the power generated will be used to supply the local loads first, then to charge the battery. The redundant power will export to the public grid as set in Export Control.

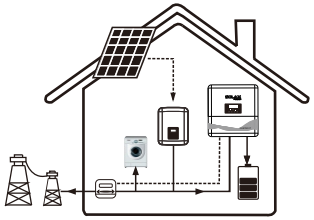
·In the absence of the external generator, or the power is not enough, battery will discharge for local loads first, and grid will supply power when power from the battery is not enough or battery reaches the minium capacity.



Work modes: **Force time use**

Priority:battery>load>grid(when charging)
Priority:load>battery>grid(when discharging)
This mode applies to the area that has peak and valley electricity price. User can use off-peak electricity to charge the battery.

·The charging and discharging time can be set flexibly.

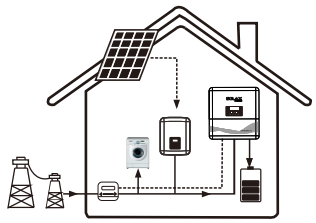


Work modes: **Feed in Priority**

Priority:load>grid>battery
This mode applies to the area that has high feed-in tariff or export control.

·In the case of the external generator, the power generated will be used to supply the local loads firstly, then export to the public grid. The redundant power will charge the battery.

·In the absence of the external generator, or the power is not enough, battery will discharge for local loads first, and grid will supply power when power generated is not enough or battery capacity reaches too low.



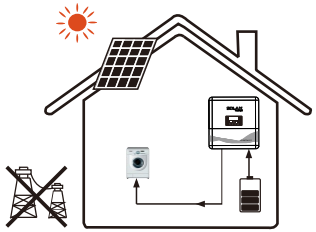
Work modes: **Back up mode**

Priority:battery>load>grid
This mode applies to the area that has frequent power outages. And this mode ensures the battery will has enough energy to supply when the grid is off.

·In the case of external power generation equipment, the power generated will be used to charge the battery fully firstly, then supply the local loads. The redundant power will be exported to the public grid.

·In the absence of an external power generation device, charge the battery with the public grid.

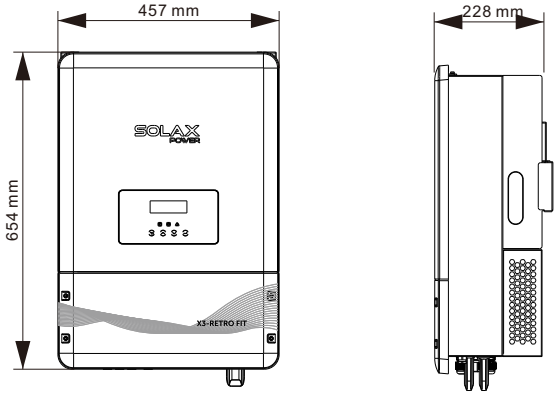
·The inverter will switch to EPS mode only when the grid is abnormal.



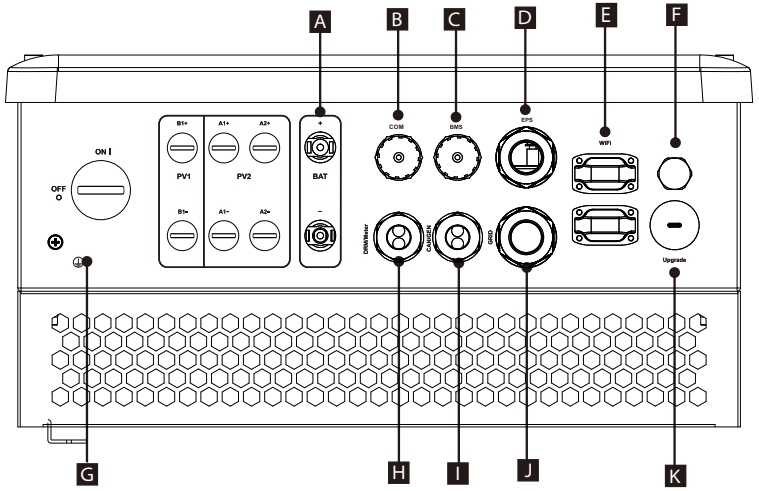
＊ EPS Status

When the grid is off, system will supply emergency power from the battery to supply the EPS home loads. (Battery is necessary in EPS mode.)

3.3 Dimension



3.4 Terminals of Inverter



Object	Description
A	Battery connection area
B	COM
C	Battery communication port
D	EPS output
E	WiFi port for external Pocket WiFi
F	Waterproof valve
G	Earthing screw
H	DRM/Meter port
I	CAN communication port for parallel operation / Generator communication port
J	Grid output
K	USB port for upgrading

WARNING !

Qualified electrician will be required for the installation.

4. Technical Data

4.1 AC output/input

Model	X3-Fit-8.0E	X3-Fit-8.0C	X3-Fit-10.0E	X3-Fit-10.0C
AC output				
Norminal AC power[VA]	8000	8000	10000	10000
Max. apparent AC power[VA]	8000	8000	10000	10000
Rated grid voltage(range)[V]	400V/230VAC;380V/220VAC			
Rated grid frequency[Hz]	50/60			
Norminal AC current[A](@230VAC)	11.6	11.6	14.5	14.5
Max.AC current[A]	12.8	12.8	16.0	16.0
Displacement power factor	0.8 leading...0.8 lagging			
Total harmonic distortion(THDi)	< 2%			
Load control	Being developed			
AC input				
Norminal AC power[VA]	8000	8000	10000	10000
Rated grid frequency[Hz]	50/60			
Rated grid frequency(range)[Hz]	47...53/57...63			
Norminal AC current[A]	11.6	11.6	14.5	14.5
Max.AC current[A] (@230VAC)	12.8	12.8	16.0	16.0
Rated grid voltage(range)[V]	400V/230VAC;380V/220VAC			
Displacement power factor	0.8 leading...0.8 lagging			
AC inrush current[A]	32			
MAX.output overcurrent protection[A]	40			
AC maximum output fault current[A]	75			

4.2 Internal Charger

Model	X3-Fit-8.0E	X3-Fit-8.0C	X3-Fit-10.0E	X3-Fit-10.0C
Battery type	Lithium battery/Lead-acid battery			
Battery voltage range[V]	160-800			
Max.charge/discharge current[A]	35A			
Communication interfaces	CAN/RS485			
Reverse connect protection	Yes			

4.3 Efficiency, Safety and Protection

Model	X3-Fit-8.0E	X3-Fit-8.0C	X3-Fit-10.0E	X3-Fit-10.0C
Max. Battery charge/discharge efficiency	96.00%/96.50%	96.00%/96.50%	96.00%/96.50%	96.00%/96.50%
Safety & Protection				
Over/under voltage protection	YES			
Monitoring ground fault protection	YES			
Grid protection	YES			
Back feed current monitoring	YES			
Residual current detection	YES			
Anti-islanding protection	YES			
Over load protection	YES			
Over heat protection	YES			

4.4 EPS output(apply to version E only)

Model	X3-Fit-8.0E	X3-Fit-10.0E
EPS rated power[VA]	8000	10000
Max. EPS power[VA]	8000	10000
EPS rated voltage[v]	400/230VAC	
EPS rated current[A](@230VAC)	11.6	14.5
EPS peak power[W]	8000,600s(100%~120%) 9600,60s(120%~150%) 12000,0.1s(> 150%)	10000,600s(100%~120%) 12000,60s(120%~150%) 15000,0.1s(> 150%)
Switch time[s]	<1.5s	
Total harmonic distortion(THDv)	<2%	
Parallel operation	YES	
Compatible with the generator	Signal provided(Being developed)	

4.5 General Data

Model	X3-Fit-8.0E	X3-Fit-8.0C	X3-Fit-10.0E	X3-Fit-10.0C
Dimension (W/H/D)[mm]	654*457*228			
Dimension of packing (W/H/D)[mm]	777*567*423			
Net weight [kg]	40	40	40	40
Gross weight [kg]	43	43	43	43
Installation	Wall-mounted			
Operating temperature range[℃]	-20~+60 (derating at 45)			
Storage temperature [℃]	-20~+60			
Storage/Operation relative humidity	0%~100%, condensing			
Altitude [m]	<2000			
Ingress Protection	IP65(for outdoor use)			
Standby consumption[W]	<7			
Idle mode	YES			
Over Voltage Category	III(Electric supply side), II(Battery side)			
cooling	Nautral			
Inverter Topology	Transformerless			
Communication interface	RS485, Meter, WiFi(optional), DRM, USB, ISO alarm			
LCD display	Backlight 20*4 character			
Standard warranty	Standard 5 years(10 years optional)			

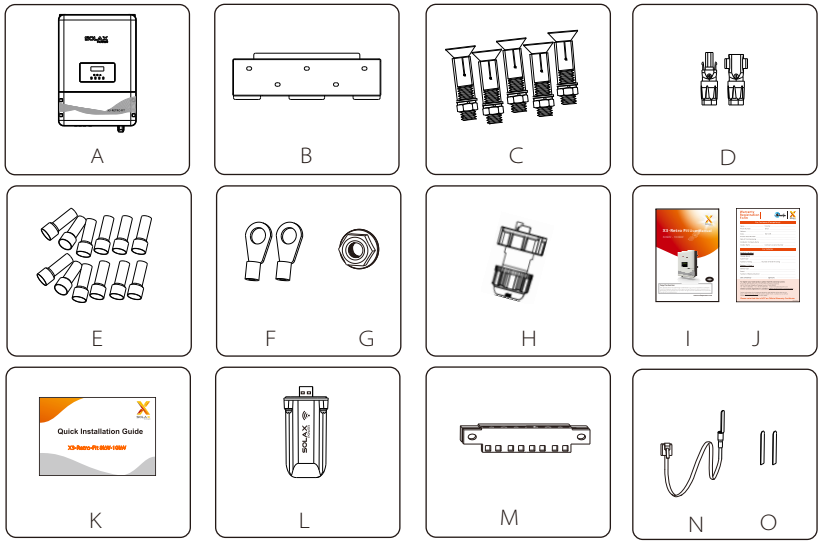
5. Installation

5.1 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.

5.2 Packing List

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



Object	Description
A	Inverter
B	Bracket
C	Expansion tubes & Expansion screws (5/5)

D	Battery connectors (1*positive, 1*negative)
E	AC terminals/EPS terminals (optional)/Earth terminals (12)
F	Ring terminal (for grounding) (2)
G	Grounding nut
H	Waterproof connector with RJ45 (2*RJ45)
I	User manual
J	Warranty card
K	Quick installation guide
L	Wifi module (optional)
M	8 pin terminal for meter connection
N	NTC (optional)
O	Scotch tape(2) (optional)

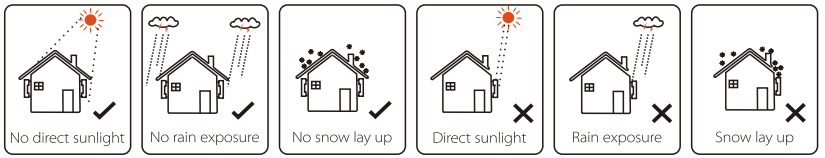
5.3 Mounting

➢ Installation Precaution

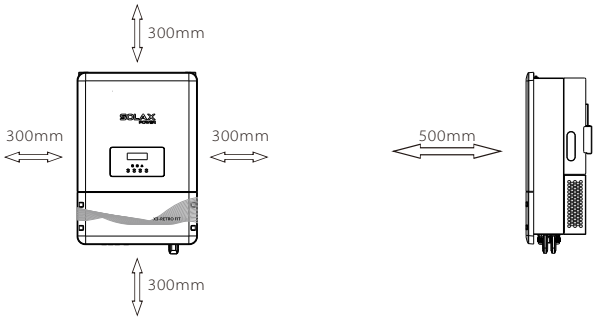
X3-Retro Fit Series inverter is designed for outdoor installation (IP 65).
Make sure the installation site meets the following conditions:

- Not in direct sunlight.
- Not in areas where highly flammable materials are stored.
- Not in potential explosive areas.
- Not in the cool air directly.
- Not near the television antenna or antenna cable.
- Not higher than altitude of about 2000m above sea level.
- Under good ventilation condition.
- The ambient temperature in the range of -20℃ to +60℃.
- The slope of the wall should be within ±5°.
- The wall for mounting the inverter should meet conditions below:
  1. Solid brick/concrete, or strength equivalent mounting surface;
  2. Inverter must be supported or strengthened if the wall's strength isn't enough(such as wooden wall, the wall covered by thick layer of decoration)

Please AVOID direct sunlight, rain exposure, snow laying up during installation and operation.



➢ Space Requirement



➢ Mounting Steps

Tools required for installation.

Installation tools : crimping pliers for binding post and RJ 45, screwdriver, manual wrench and φ8 driller.

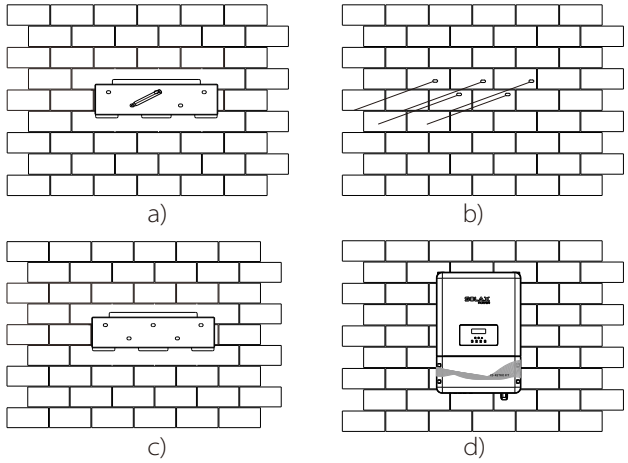
Step 1: Screw the wall bracket on the wall

1.1 Place the bracket on the wall and mark down the position of the 5 holes.
1.2 Drill holes with driller, make sure the holes are deep enough (at least 60mm) to support the inverter.
1.3 Hammer the expansion tubes in the holes, and tighten them. Then install the wall bracket with the expansion screws.(The screwdriver. Torque: 4.5±0.2Nm)

Step 2: Place the inverter on the wall mounted bracket by holding the handle holes on both sides.

Step 3: If necessary, customer can install an anti-theft lock on the top-right of the inverter.

φ8 driller . Power:4.5±0.2Nm)



6. Electrical Connection

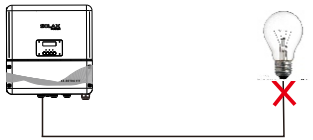
6.1 Grid Connection

X3-Retro Fit series inverter are designed for three phase grid. Voltage is 380/400V, frequency is 50/60Hz. Other technical requests should comply with the requirement of the local public grid.

Table 4 Cable and Micro-breaker recommended

Model	X3-Fit-8.0E	X3-Fit-8.0C	X3-Fit-10.0E	X3-Fit-10.0C
Cable	4-5mm²	4-5mm²	5-6mm²	5-6mm²
Micro-breaker	32A	32A	32A	32A

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



Incorrect Connection between Load and Inverter

Connection Steps:

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 the circuit-breaker from all the phases and secure against re-connection.

Step2. Remove the down-top cover from the inverter.(φ4 hexagon wrench. torque:3±0.1Nm)

Step3. Prepare AC wires.

3.1 Choose the appropriate wire(Cable size: refer to Table 4).

3.2 Reserve about 60mm of conductor cross-sectional area.

3.3 Remove 12mm of insulation from the end of wire.

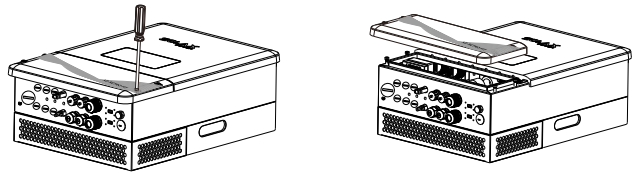
3.4 Insert stripped wires into AC terminal and insure all conductor strands are captured in the AC terminal.

3.5 Crimp the AC terminal head by using a crimping pliers and screw down screw cap tightly.

Step4. Insert AC cable into Grid port through cable nut and then tighten the cable gland. Insert L1, L2, L3 wire and N wire into the corresponding ports of AC terminal. Crimp the PE wire with earth terminal , then screw it on the grounding stud. (The screw wrench. Torque:1.2±0.1Nm)

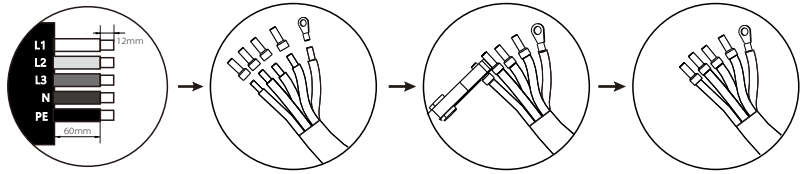
Step2.

φ4 hexagon wrench. Torque:3±0.1Nm)

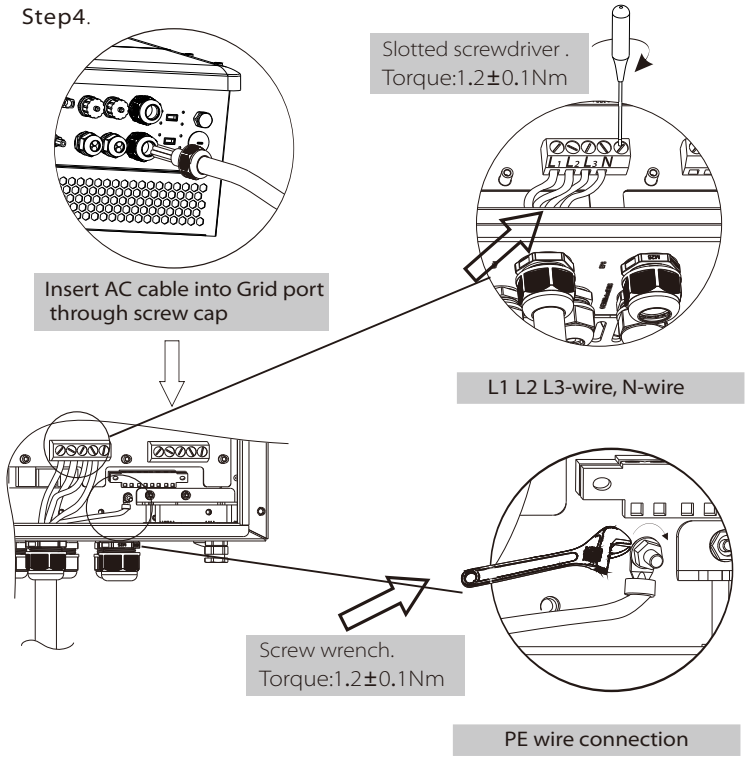


Step3.

Cable Size: Refer to Table 4(page 22)



Step4.



6.2 EPS Connection(apply to E Version)

X3-Retro Fit series inverter has On and Off grid function, the inverter will deliver output power through AC port when the grid is on, and it will deliver output power through EPS port when the grid is off.

This function can be achieved manually or automatically according to user's preference. If user wants to use the off grid function manually, **an external EPS Switch Box shall be installed.** Please refer to specific wiring diagram below or as described in quick installation guide.
For automatical solution, please contact your supplier or SolaX service.

➢ EPS wiring diagram

The below diagram are for reference based on different local wiring rules, please ensure the EPS wirings comply with the local wiring rules.
Diagram A : Neutral line of alternative supply must not be isolated or switched.
Diagram B : Neutral line of alternative supply can be isolated or switched.

Diagram A • E Version • For AU/NZ

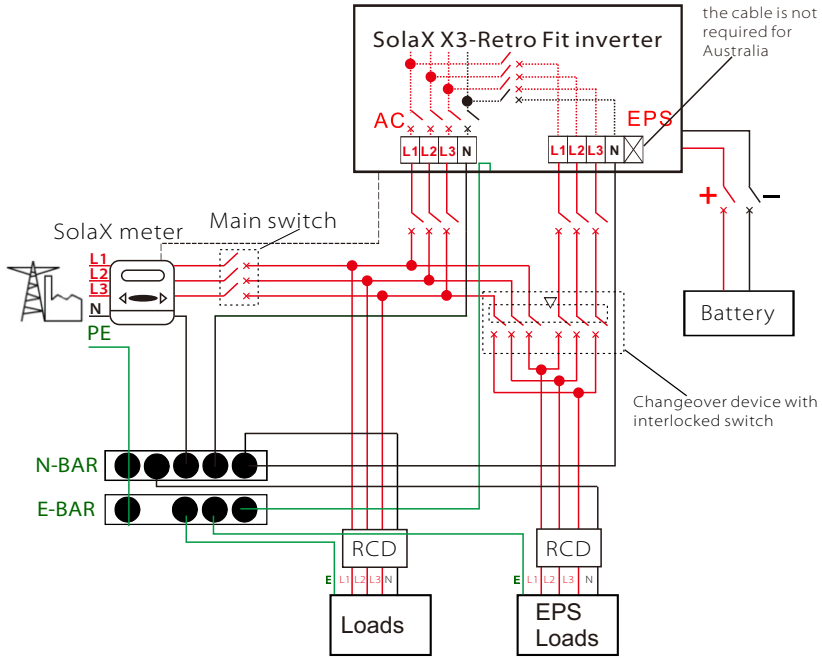
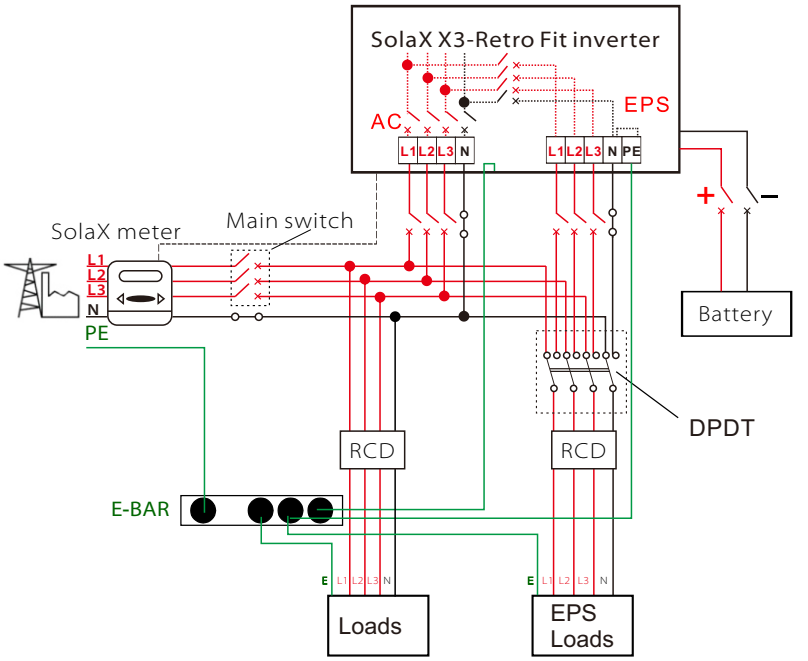


Diagram B • E Version • For Other Countries



Note!
In case of discrepancies between wiring mode of local policy and the operation guide above, espescially for the wiring of neutral line, grounding and RCD, please contact us before any operation!

➢ Connection Steps:

Step1. Prepare EPS wires.

3.1 Choose the appropriate wire(cable size: refer to picture below).
3.2 Reserve about 60mm of conductor cross-sectional area.
3.3 Remove 12mm of insulation from the end of wire.
3.4 Insert stripped wires into AC terminal and insure all conductor strands are captured in the AC terminal.
3.5 Crimp the AC terminal head by using a crimping pliers and screw down screw cap tightly.

Step2. Insert EPS cable into EPS port through screw cap and then tighten it. Insert L1,L2,L3 wire, N wire and PE wire(PE wire does not applies to Australia) into corresponding ports of EPS terminal and screw them tightenly.
(Slotted screwdriver. Torque:1.2±0.1Nm)

Step1.

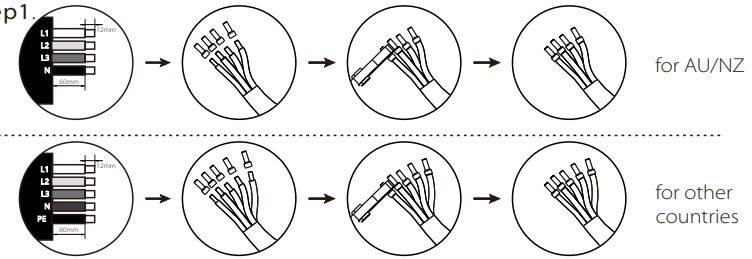
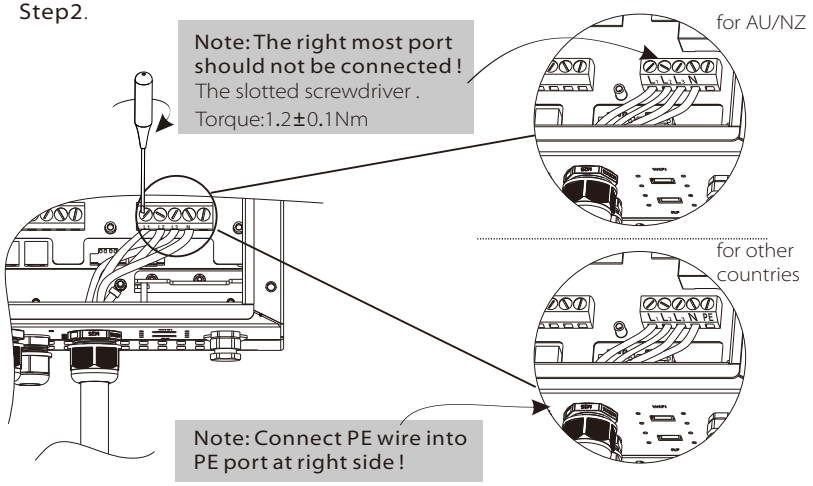


Table 5 Cable and Micro-breaker recommended

Model	X3-Fit-8.0E	X3-Fit-8.0C	X3-Fit-10.0E	X3-Fit-10.0C
EPS Cable	⩾5mm²	⩾5mm²	⩾5mm²	⩾5mm²
EPS breaker	32A	32A	32A	32A

Step2.



➢ Requirements for EPS load

Warning !

Please make sure the EPS home load power is always within the EPS output rating. Please be aware that it will also be limited by the battery installed. Less batteries will result in less EPS output power.

When an "over load" occurs, please adjust the EPS loads to make sure it is within the EPS output power range, then turn the inverter back on.

For the nonlinear load, please make sure the inrush power should be within the EPS output power range.

Below table shows some common feasible loads for you reference.

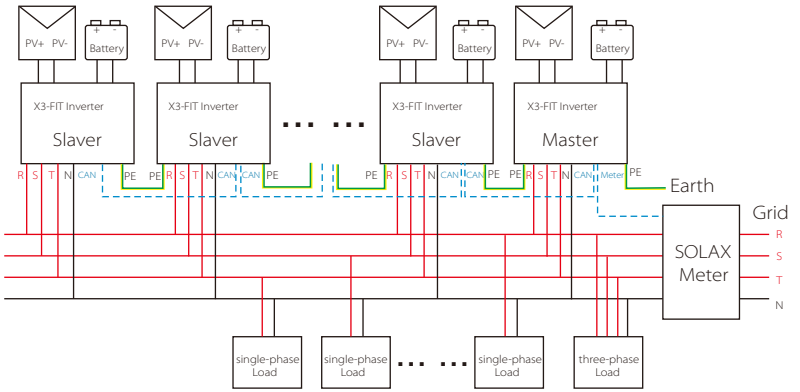
Type	Power		Common equipment	Example		
	Start	Rated		Equipment	Start	Rated
Resistive load	X 1	X 1	Incandescent lamp, TV	100W Incandescent lamp	100VA (W)	100VA (W)
Capacitive load	X 2	X 1.5	Fluorescent lamp	40W Fluorescent lamp	80VA (W)	60VA (W)
Inductive load	X 3~5	X 2	Fan, Fridge	150W Fridge	450-750VA (W)	300VA (W)

6.3 On-Grid Parallel Connection

X3-Retro Fit Series Inverter provides the parallel connection function which should make ten inverters maximumly connected in one system when the grid is on.
In this system, one inverter will be set as the "Master inverter" which will control every other inverter's energy management and dispatch control. Only one meter needs to be connected in this system and communicate with the "Master inverter" , and all the other "slaver inverters" communicate with "Master inverter " by CAN communication-parallel connection.

> **Note!**
> Please note the parallel connection function can only be used when the grid is on .The off-grid parallel connection function is being developed.

➢System Diagram



➢Work Modes in parallel system

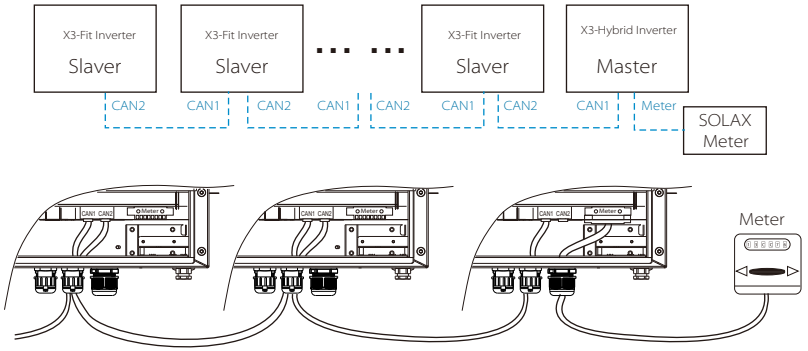
There are three work modes in parallel system, and your acknowledge of different inverter's work modes will help you understand parallel system better, therefore please read it carefully before operating.

Free mode	Only if no one inverter is set as a "Master", all inverters are in free mode in the system.
Master mode	When one inverter is set as a "Master", this inverter enters master mode. Master mode can be changed to free mode or slaver mode by LCD setting.
Slaver mode	Once one inverter is set as a "Master", all other inverters will enter slaver mode automatically. Slaver mode can not be changed from other modes by LCD setting.

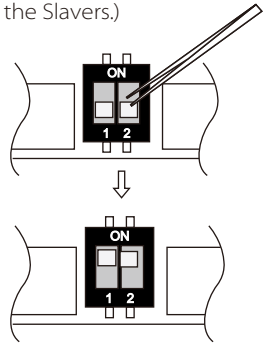
➢Wiring Operation and LCD Setting

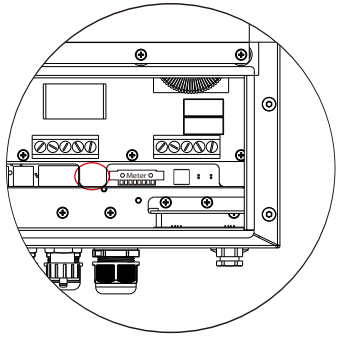
> Note: Before operation, please ensure that all the inverters' software version must be the same, otherwise the parallel function will not work.

Step1: Connect all inverters' communication together by connecting network cables between CAN ports.
- Use standard CAT7 network cables for CAN-CAN connection and CAT5 cable for Master-Meter connection.
- Insert one side of CAT7 cable into the first inverter's CAN2 port and the other side into the next inverter's CAN1 port.
- Insert one end of CAT5 cable into 485A/B on SolaX meter, and the other end into the meter terminal inside the Master inverter.

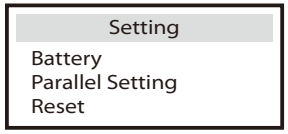


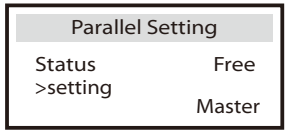
Step2: Set the DIP switch (No need to set on all the inverters) .
- Find the inverter with meter cable plugged.
- Remove the bottom-front cover from this inveter, and find the DIP switch on the right of the CAN2 port on the control board.
- Push the white DIP switch to "ON" position (from down to up) by a suitable tweezer. (Note: No need to set it for all, but only for the Master inverter and one of the Slavers.)





Step3: On the inverter with meter connected, usually the Master, select "Parallel setting" in the setting, and change the status to "Master".





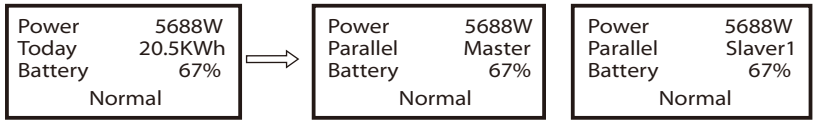
➢How to exit from parallel system

If you need to exit parallel mode on any of the inverters, please follow the steps:
-Firstly, disconnect all the CAN cables on this inverter.
-Then change the parallel setting to "Free". This inverter then can work standalone.

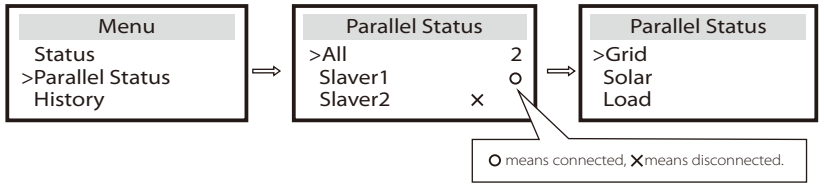
Note!
- If a slaver inverter is set to "Free" mode but not disconnect the network cable, this inverter will return to "Slaver" mode automatically.
- If a slaver inverter is disconnected with other inverter but not be set to "Free" mode, this inverter will stop working and maintain "waiting" status.

➢LCD display

Main display:
Once inverter enters parallel system, the "today yield" will be replaced by " Inveter Class", and parallel related faults have higher priority to be shown on the LCD display than the other faults.



Status display:
User can obtain all the status data from master inverter. System power and individual slaver inverter power can be seen in status display of master inverter.



➢Parallel Control Function

Master inverter in the parallel system has absolute control of all slaver inverters' energy management and distribution control. Once the master inverter comes with an error and stop working, all the slavers will stop simultaneously. But the master can work independently from all slavers thus it will not be affected by any slaver's error.

The whole system will be running according to the master's settings, and most settings on each slaver will be kept but not be excuted. Only when the slaver inverter is set free from the system, running as an independent unit, all its settings can be re-excuted.

The rest of this section covers several important parallel control functions, and the next page table shows which LCD options are controlled by master inverter and which can work independently.

Off mode setting:
Off mode can only be set by master inverter (press and hold the forth key) .

Safety setting:
System safety protection will be the same as set on the master inverter. Slaver inverter protection mechanism will only be triggered by the master inverter.

Self-use setting:
If system is running as self-use mode, please note the FeedinPowerLimit set of master inverter is for the overall system and the corresponding set of slaver inverter is invalid.

Force on time setting:
If system is running as force on time mode, please note all sets about force on time are all for the overall system and the corresponding sets of slaver inverter are invalid.

Power Factor setting:
Power factor will stay the same as set on the Master inverter, while settings on the slavers will be invalid.

Remote control setting:
The remote demand instructions received by master inverter will be interpreted as the demand instructions to overall system.

6.4 Battery Connection

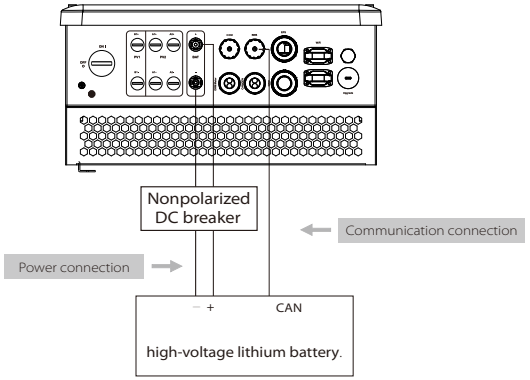
Charging & discharging system of X3-Retro Fit series inverter is designed for **high-voltage lithium battery**.
Before choosing battery, please note the maximum voltage of battery can not exceed **800V** and the rated voltage of battery can not exceed **400V**, and the battery communication should be compatible with X3-Retro Fit inverter.

➢ Battery breaker

Before connecting to battey, please install a nonpolarized DC breaker to make sure inverter can be securely disconnected during maintanance.

Model	X3-Fit-8.0E	X3-Fit-8.0C	X3-Fit-10.0E	X3-Fit-10.0C
Voltage	Nominal voltage of DC breaker should be larger than maximum voltage of battery.			
Current[A]	50A			

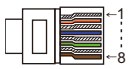
➢ Battery connection diagram



Note:
When working with Pylontech batteries, It is recommended the number of battery module (H48050-15S) is 4-15 and the number of battery manager system (SC0500A-100S) is 1.
When working with SOLAX batteries, It is recommended the number of battery module (HV10045/HV10063) is 2-4 and the number of battery controller(MC0500) is 1.
For Triple Power 5.8 battery, the number of T-BAT H 5.8 is 1 and HV11550 is 1-3.

➢ BMS PIN Definition

Communication interface bewteen inverter and battery is CAN with a RJ45 connector.



PIN	1	2	3	4	5	6	7	8
Definition	NTC	GND	GND	BMS_CANH	BMS_CANL	GND	BMS_485A	BMS_485B

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

➢ Power Connection Steps:

Step1. Choose the 9 AWG wire and strip the cable to 15mm.

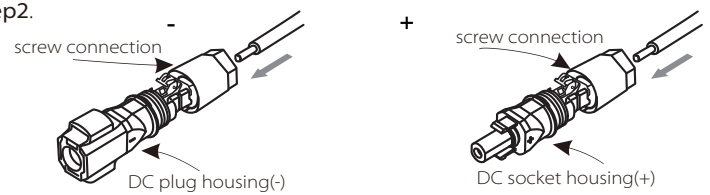
Step2. Insert the stripped cable into the battery power connectors(negative cable for DC plug(-) and positive cable for DC socket(+) are live). Hold the housing on the screw connection.(Tightening torque:3.0Nm)

Step3. Press down the spring clamp until it clicks audibly into its place.(The wire strands must be visible in the chamber)(Tightening torque: 3.0±0.1Nm)

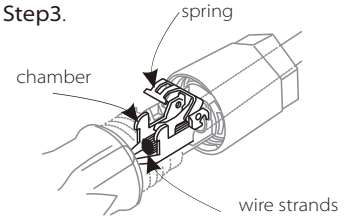
Step4. Tighten the screw connectors(Tightening torque:3.0Nm)

Step5. Plug the BAT conntector into the corresponding BAT connector on inverter.

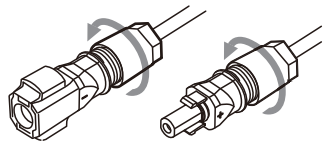
Step2.



Step3.

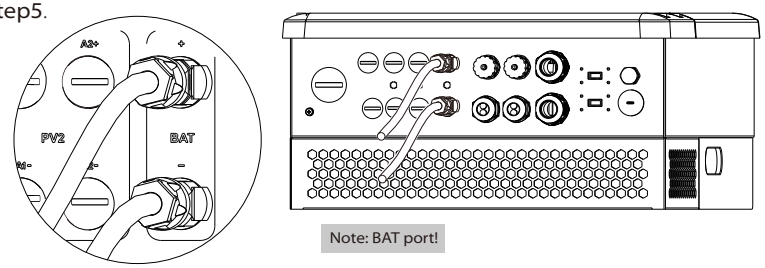


Step 4.



Tightening torque: 2.0Nm

Step5.



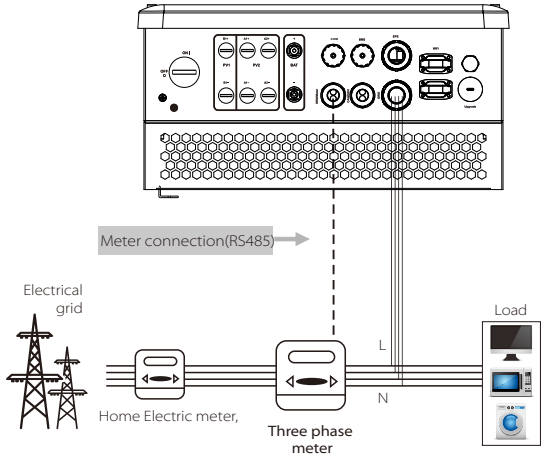
Note: The positive and negative lines must be connected correctly to the BAT+ and BAT- terminals. Otherwise it may cause damage or fire to the inverter.

6.6 Meter Connection

Meter is used for monitoring the power usage for entire house, at the meantime, inverter will also need the data from Meter to achieve the Export Control Function.

> Note !
> It is necessary to connect meter to inverter otherwise inverter will shutdown with a "Meter fault" alert.
> The meter communication only works when meter is compatible with the inverter.

➢ Meter connection diagram



➢ Meter Interface

Communication interface bewteen inverter and meter is RS485 with Green terminal.

1	2	3	4	5	6	7	8
485A	485B	Shutdown	+3.3V	GND	EPS	RES_A	GEN_B

Note: 1 and 2 are the function interface of electricity meter; 3 and 4 are intelligent switch interfaces; 5 and 6 are parallel interface; 7 and 8 are reserved interfaces.

➢ Meter Connection Steps:

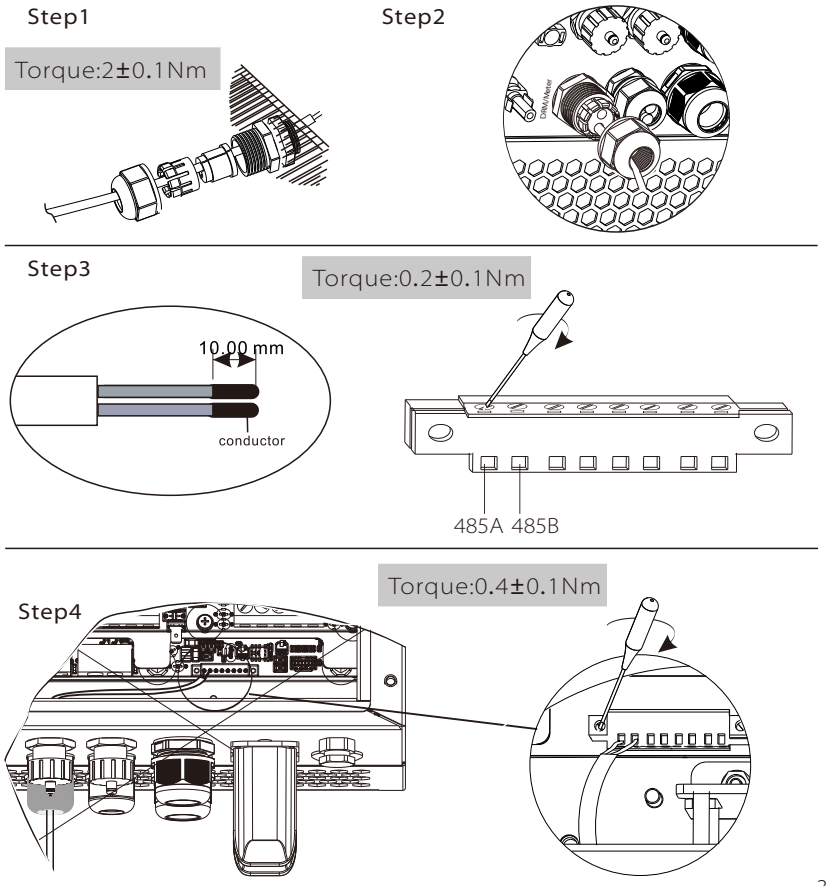
X3-Retro Fit can work with a few different brands of meters, therefore please kindly note here we are going to introduce the meter connection on the inverter side only. For the connection on meter side, please refer to the specified meter manual.

Step1. Disassemble the GEN/Meter/BMS cable gland. (Torque:2±0.2Nm)

Step2. Prepare a communication cable(without sheath) and insert the communication cable through the cable nut.

Step3. Then insert RS485A/B wires into the correct meter terminal. Then tighten the corresponding turnbuckle with a screwdriver. (Torque: 0.2±0.1Nm)

Step4. Insert connector into Meter terminal inside of the inverter and tighten the screws with a slotted screwdriver.(Torque:0.4±0.1Nm)



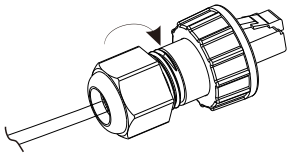
➢ Communication Connection Steps:

Step1. Disassemble the BMS cable gland.

Step2. Prepare a communication cable(without sheath) and insert the communication cable through the cable nut.

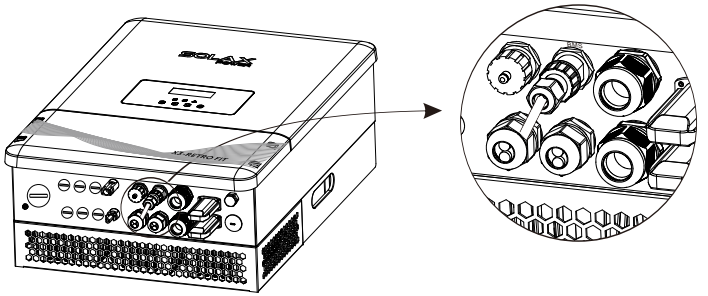
Step3. Insert the communication terminal into the BMS port.

Step1,2



Tighten torque:3.0Nm

Step3



6.5 Earth Connection(mandatory)

User can addtionally earth the inverter to the enclosure of a second earthing or equipotential bonding if it is required by local safety. This prevents electric shock if the original protective conductor fails.

➢ Earth Connection Steps:

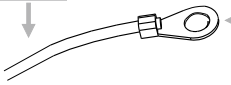
Step1. Strip the earthing cable insulation and insert the stripped cable into the ring terminal, then clamp it .

Step2. Place the ring terminal into the grounding rod and tighten the grounding screw with a screwdriver.

.

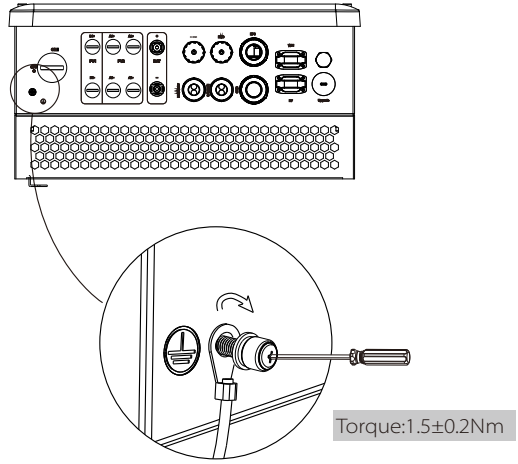
Step1

Cable size: 12AWG.



ring terminal

Step2



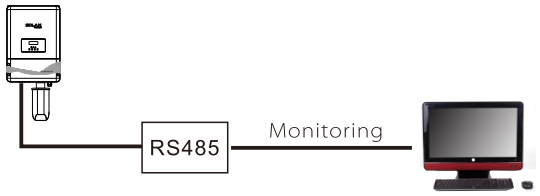
Torque:1.5±0.2Nm

6.7 COM Connection

COM communication interface, which can be upgraded to man-machine communication interface.Output voltage, current, frequency, fault information and other operational information can be transferred to PC or other monitoring equipment through these interfaces.

➢ Application Occasion

COM is a standard communication interface which can transmit the realtime data from inverter to PC or other monitoring devices.

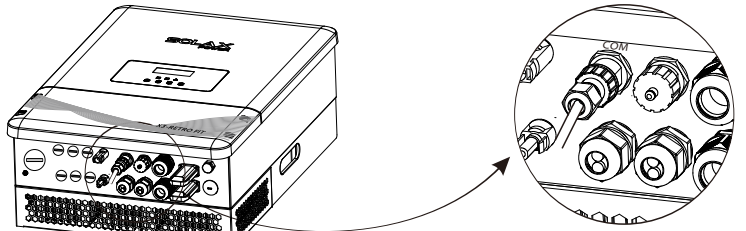


➢ COM PIN Definition

1	2	3	4	5	6	7	8
X	X	GND	485A	485B	X	X	X

➢ COM Connection Steps:

Please refer to BMS connection steps(Page32) for COM connection. Please kindly note that the PIN definition and port position may be slightly different.

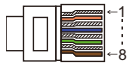


COM Port

6.8 DRM Connection

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

Mode	Requirement
DRM0	Operate the disconnection device
DRM1	Do not consume power
DRM2	Do not consume at more than 50% of rated power
DRM3	Do not consume at more than 75% of rated power AND Source reactive power if capable
DRM4	Increase power consumption (subject to constraints from other active DRMs)
DRM5	Do not generate power
DRM6	Do not generate at more than 50% of rated power
DRM7	Do not generate at more than 75% of rated power AND Sink reactive power if capable
DRM8	Increase power generation (subject to constraints from other active DRMs)

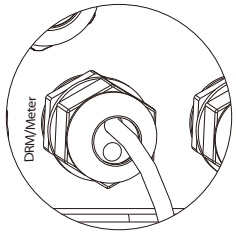


1	2	3	4	5	6	7	8
DRM1/5	DRM2/6	DRM3/7	DRM4/8	+3.3V	DRM0	GND	GND

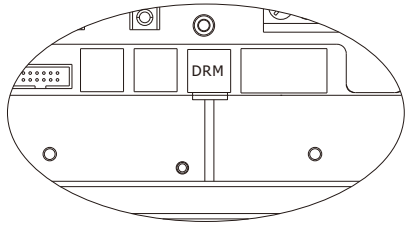
Note: Only PIN6(DRM0) and PIN1(DRM1/5)are available now, and other PIN functions are being developed.

➢ DRM Connection Steps:

Please refer to BMS connection steps (page30) for DRM connection. Please kindly noted the PIN definition and port position will be slightly different.



DRM/Meter Port



DRM Port: The third RJ45 port from left side

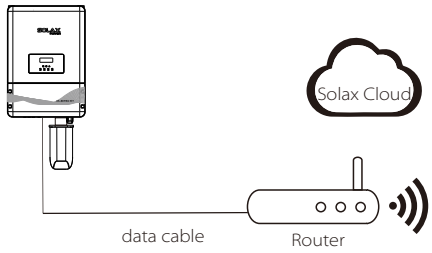
6.9 LAN Connection

LAN communication is the standard communication interface.
It can transmit the data between the router and inverter via the local network

➢ Application Occasion

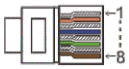
This function is applicable to the below situation:
when the WiFi signal is too weak to transmit data, user can use LAN Port for the monitoring with a data cable.

Note: The WiFi module can still be connected when using LAN connection.



➢ LAN PIN Definition

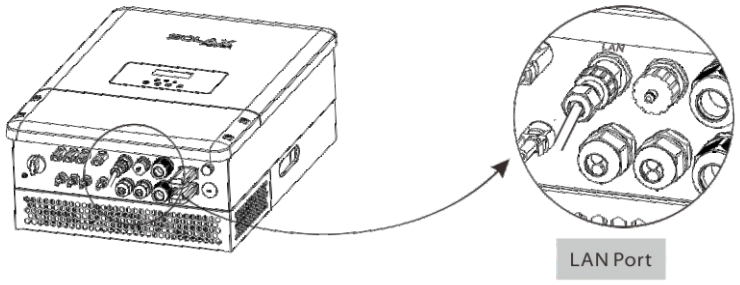
Communication interface between inverter and router is RS485 with a RJ45 connector.



1	2	3	4	5	6	7	8
TX+	TX-	RX+	X	X	RX-	X	X

➢ LAN Connection Steps:

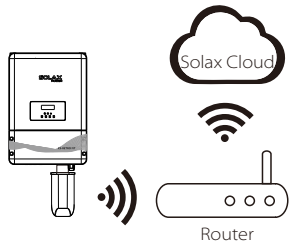
Please refer to BMS connection steps(page32) for LAN connection. Please kindly note the PIN definition and port position will be slightly different.



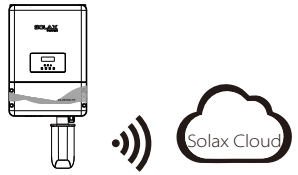
6.10 WiFi Connection(optional)

Inverter provides a Monitoring port which can collect data from inverter and transmit it to monitoring-website via an external monitoring data collector. SolaX could provide three type monitoring data collectors, and they are Pocket wifi, Pocket LAN and Pocket GPRS. User could choose an appropriate Pocket product according to network environment. (Purchase the product from supplier if needed)

➢ Pocket WIFI connection diagram



➢ Pocket GPRS connection diagram

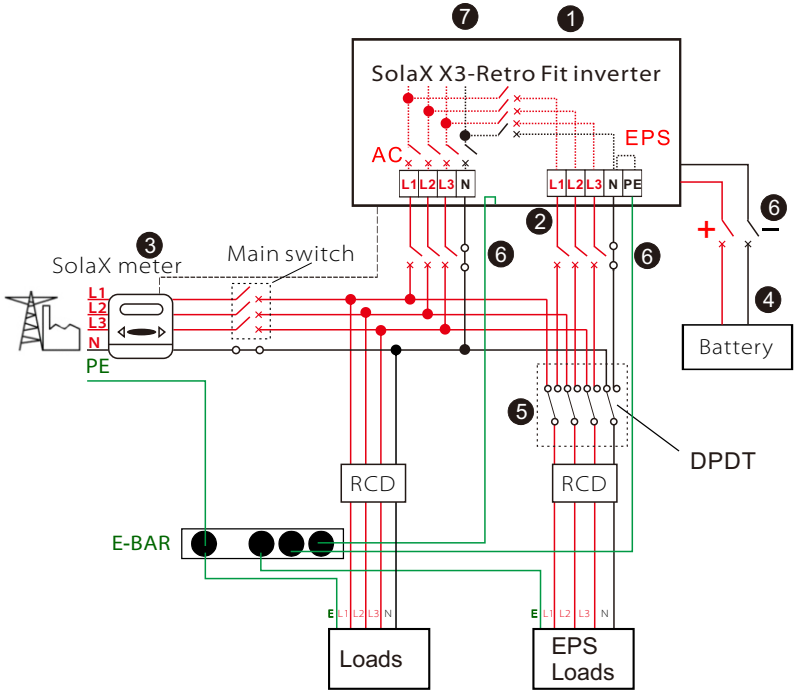


Please check the Pocket WiFi user manual/Pocket LAN user manual/Pocket GPRS user manua for more details.

6.11 Inverter Operation

➢ **Start inverter after checking all the below steps:**

❶ Double check the inverter is well fixed on the wall.
❷ Double check all the AC wirings in place.
❸ Double check the meter is properly connected.
❹ Make sure the battery BMS and DC power cables are well connected.
❺ Make sure the external EPS contactor is well connected. (If applicable)
❻ Turn on the AC isolator, EPS switch and Battery isolator.
❼ Press and hold the "Enter" key for five seconds to exit Off Mode. (Note: Off Mode is set by default.)



➢ **Check the inverter:**

Step1. Inverter will start up automatically when the power from the battery is detected.
Step2. Check the status of the LED indicator and the LCD screen. The first indicator should be blue. On the LCD it will show "waiting" -> "checking" -> "Normal".

> Note !
> If the first LED indicator isn't blue, please check the following points:
> - Check whether all the connections are properly connected.
> - All the external breakers/isolators are switched ON.

Step3. Please follow the setup guide on the screen when it is switched on for the first time. For any specific setting, please refer to Section 8 in this manual.
Step4. Set WiFi according to WiFi user manual.
Step5. Operate "Self Test". (if needed)

➢ **Self-test in accordance with CEI 0-21(applies to Italy only)**

The self-test is only required for inverters, which are commissioned in Italy. The Italian standard requires that all inverters feeding into the utility grid are equipped with a self-test function in accordance with CEI 0-21. During the self-test, the inverter will consecutively check the protection reaction times and values for overvoltage, undervoltage, overfrequency and underfrequency.

Selftest function is available at any time, and the test report will show on the LCD display for end-user.

➢ **Shut down the inverter :**

Step1. Press and hold the "Enter" key for five seconds to enter Off Mode.
Step2. Turn off the AC switch, EPS switch and battery switch.
Step3. Wait 5 minutes before doing any operation on the inverter.

7. Firmware Upgrading

User can upgrade inverter's firmware via an U-disk.

➢ Preparation

Please ensure the inverter is powered on with steady DC and AC power.
Battery must be kept ON throughout the whole upgrade procedure.
Please prepare a PC and an U-disk.

> **Warning!**
> Make sure the battery voltage is higher than 180V, otherwise it may cause serious failure or damage to the inverter during the upgrade.

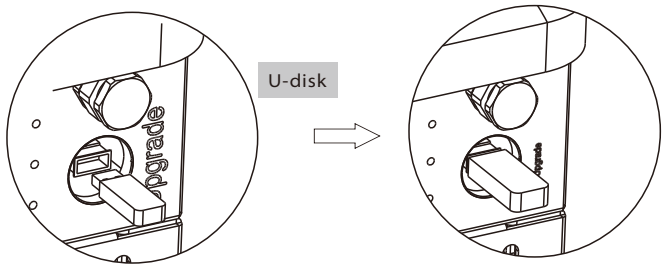
➢ Upgrading Steps:

Step1. Please contact SolaX service to get the latest firmware. Then add a new folder named "Update" in the root directory on your U-disk, and two more sub-folders named "ARM" and "DSP" under "Update". Please copy the firmware files into ARM and DSP respectively. It will be like:
"Update\ARM\618.00098.00_Hybrid_X3G3_Manager_VX.XX_XX-XX.usb";
"Update\DSP\618.00096.00_Hybrid_G3X3_Master_VX.XX_XX-XX.hex";
(VX.XX is version number, xx-xx is file compilation date)

> **Warning!**
> Make sure to strictly follow the above steps. Do not change the firmware name or folder name. USB format can't be NTFS and it must be less than 16GB, otherwise it may brick the inverter.

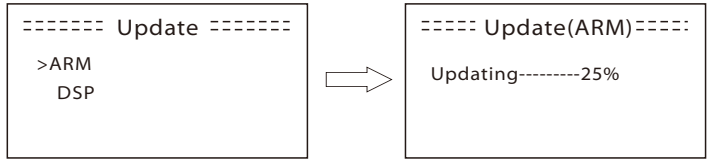
Step2. Press and hold the "Enter" key for 5 seconds to enter Off Mode. Then unscrew the waterproof lid and insert U-disk into the "upgrade" port at the bottom of the inverter.

Step2



Step3. The LCD display on the inverter will be shown as the picture in the next page. Select ARM by the "OK" key. Wait for the update process to finish. Then repeat the same steps to update DSP.

Step3



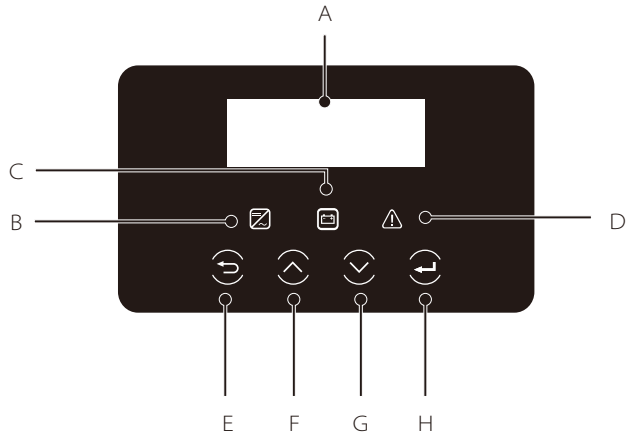
Step4. After the upgrade is finished, the LCD will display "succeed"(only for DSP upgrades), please remember to pull off the U-disk, screw the waterproof lid and press the "Esc" to return to the Main interface. Then press and hold the "Enter" key to exit Off Mode.

Warning!

If the upgrading is broken off during operation, please ensure the inverter is steadily powered on and reinsert the U-disk.

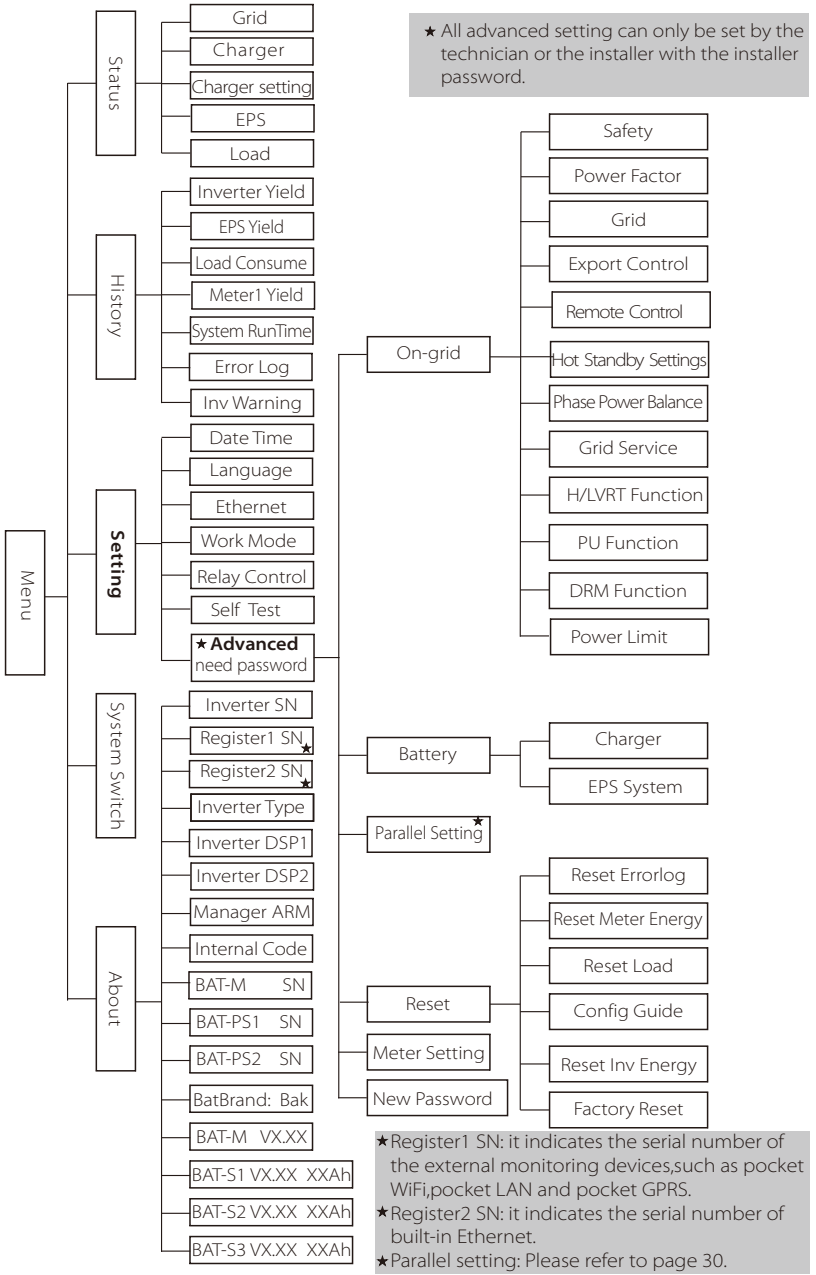
8. Setting

8.1 Control Panel



Object	Name	Description
A	LCD Screen	Display the information of the inverter.
B	Indicator LED	Constant blue: The inverter is in normal status or in EPS mode. Flashing blue: The inverter is in waiting or checking status. Off: The inverter is in fault status.
C		Constant green: The battery communication is working. Flashing green: The battery communication is normal and in idle status. Off: The battery does not communicate with inverter.
D		Constant red: The inverter is in fault status. Off: The inverter has no errors.
E	Function Button	ESC button: Return from current interface or function.
F		Up button: Move up or increase the value.
G		Down button: Move up or decrease. the value
H		OK button: Confirm the selection.

8.2 Menu Structure please refer to the inverter for the most updated structure



★ All advanced setting can only be set by the technician or the installer with the installer password.

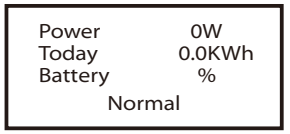
★Register1 SN: it indicates the serial number of the external monitoring devices,such as pocket WiFi,pocket LAN and pocket GPRS.
★Register2 SN: it indicates the serial number of built-in Ethernet.
★Parallel setting: Please refer to page 30.

8.3 LCD Operation

LCD Digital Display

The main interface is the default interface, the inverter will automatically jump to this interface when the system starts up successfully or the screen is not operated for a period of time.

The information of the interface is as below. "Power" means the instant output power; "Today" means the power generated within the day. "Battery" means the left capacity of battery energy.

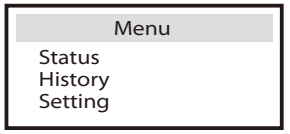


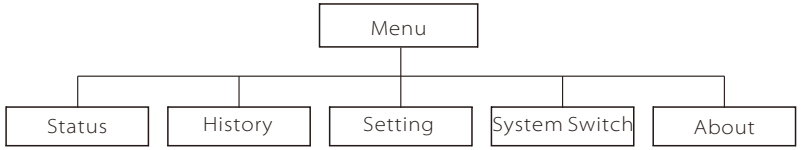
Menu interface

The menu interface is a transfer interface for user to get into another interface to change the setting or read the information.

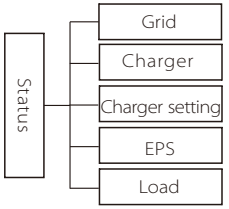
-User can get into this interface by pressing "OK" button when LCD displays the main interface.

-User can select interface by pressing Up or Down button





➢ Status



● Status

The status function contains five items of the inverter(grid, charger, charger-setting, eps and Load).Press up and down to select and press "OK" to confirm the selection, press "ESC" to return to Menu.

Status
Grid
>Charger
Charger-Setting

a) Grid

This status shows the current grid condition such as voltage, current, output power, the local consumed power and frequency.

Pout measures the output of inverter;

Pgrid measures the power exported to or imported from grid.

Positive value means the energy feeds into grid, negative value means the energy used from the grid.

Power Meter1	
PaGrid	0W
PbGrid	0W
PcGrid	0W

InvState A	
>Ua	0.0V
Ia	0.0A
PaOut	0W

b) Charger

This status shows the charger situation of the system, including the battery voltage, charge or discharge current. Charge or discharge power, battery capacity, battery temperature, BMS status, charge and discharge limit. "+" means in charging; "-" means in discharging.

Charger	
U	400.0V
I	-1.0A
P	-400W

c) Charger-Setting

Here you can see the parameters of the battery Settings (lithium battery and lead-acid battery).

Charger-Setting	
Min Capacity	10%
MaxChCur	19.0A
Max DisChCur	35.0A

Charger-Setting	
Charge Absorp	0,0V
Chargr Float Vot	0.0V
DischargeCUtVot	0.0V
Charge MaxCU	0.0A
Discharge MaxCU	0.0A

d) EPS

EPS will only have data when the inverter is working in EPS mode, it will show the real time data of the EPS output such as voltage, current, power.

EPS_S	
>PaS	0VA
PbS	0VA
PcS	0VA

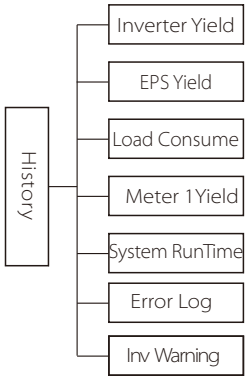
EPS_State A	
>Ua	0.0V
Ia	0.0A
PaActive	0W

e) Load

If the inverter is plugged with a smart plug, this status shows the real time load power, include load1 power and load 2 power.

Load
>L1 Power
0W

➢ History

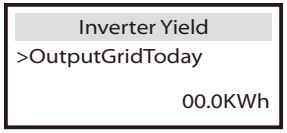


● History

The history function contains seven items of the information: Inverter yield, EPS yield, load consume, Meter 1 Yield, system Run Time and Error Log, Inv Warning.
Press up and down to select and press "OK" to confirm the selection, press "ESC" to return to Menu.

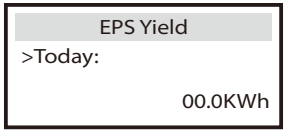
a) Inverter Yield

This function contains inverter yield for today, yesterday, this month, last month and the total.



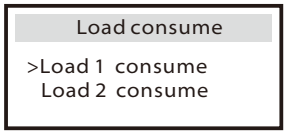
b) EPS Yield

The EPS Yield function contains charger yield for today and total.



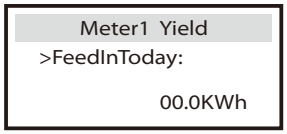
c) Load consume

The Load consume contains the energy consumed by specific loads by today and in total.



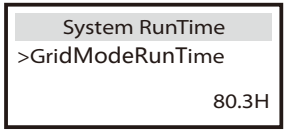
d) Meter Yield

The Meter Yield contains four items: FeedInToday, FeedInTotal, ConsumeToday and ConsumeTotal.



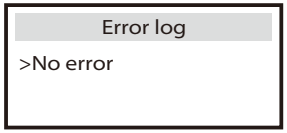
e) System RunTime

This function contains grid mode run time and EPS mode run time.



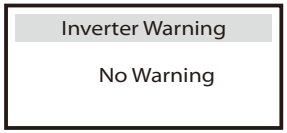
f) Error Log

The Error logs record the lastest six error messages happened.

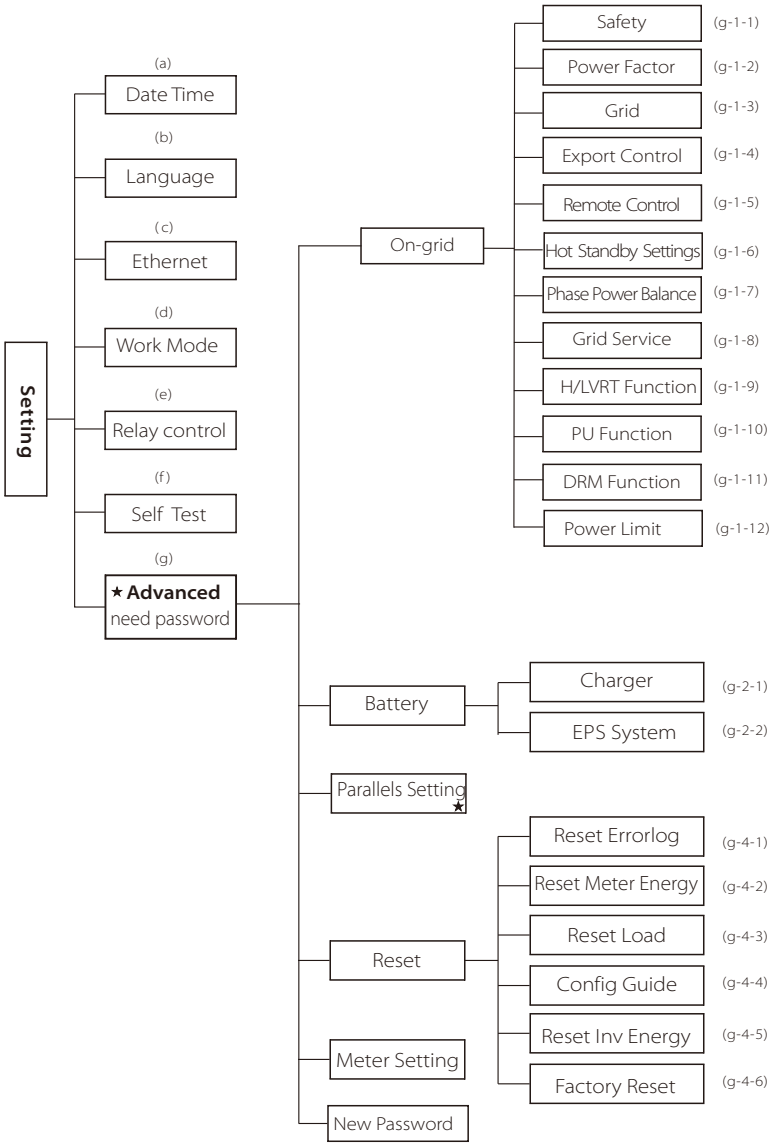


g) Inv warning

All warnings for the machine status are displayed here.



➢ Setting



★Parallels setting: Please refer to page 38.

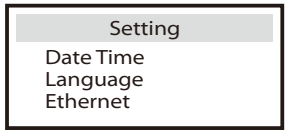
● Setting

This function is used for setting of the inverter time, connection, battery, grid and so on.

Enduser can set Date Time, Language and Ethernet directly.

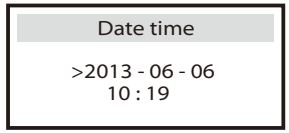
But for advance setting, it requires installer password to operate most of the professional settings.(The installer password is 2014.)

Note: Only qualified installers or the owner can use this password. Do Not change anything if you are unaware of the affect of the change or not authorized.



a) Date Time

This interface is for user to set the system date and time.



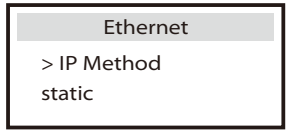
b) Language

This inverter provides several languages for customer to select.

c) Ethernet

There are two modes to obtain IP address: static and DHCP.

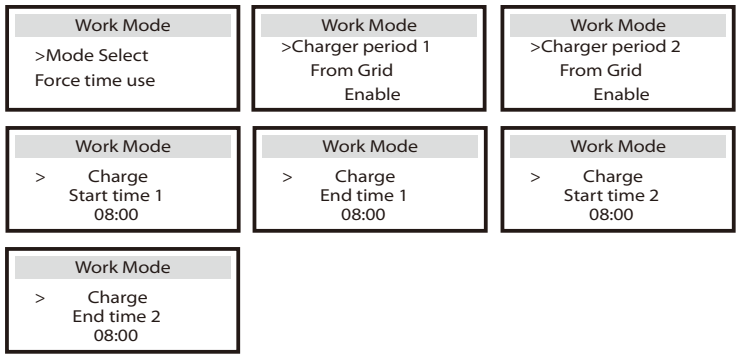
User can set the information about ethernet such as IP address, subnet mask number and default gateway number and Mac address.



d) Work mode
There are 4 work modes for your selection. They are only available when On-grid Mode.

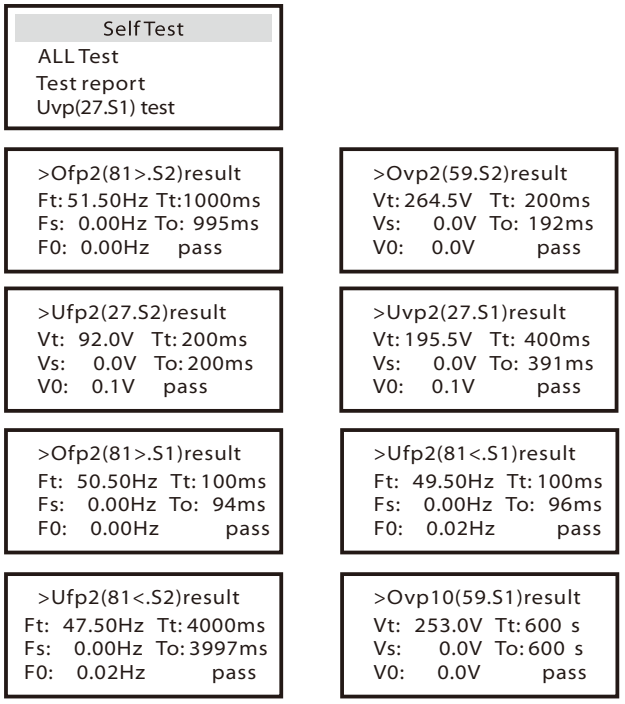
Parameter	Comment
Self Use (default)	The power from the external generator in the home system will be used to supply the local loads first, followed by charging the battery. The redundant power will be exported to the grid as set in Export Control. When there is no extra power generated, battery will start discharging for local loads usage, and Grid will supply power when the battery power is not enough.
Back Up Mode	Battery will stop discharing to keep higher capacity when the grid is on. Only when the gird is off and the power generated is not enough, battery will start to discharge to keep the emergency load working normally. This work mode applies to the area where suffering from blackout regularly.
Feed in Priority	The priority of inverter output power is: supplying the load → feeding to the grid → charging the battery. This work mode applies to the area with high feed-in tariff.
Force Time Use	In this work mode there are two force charging periods can be set flexibly, and also an option of whether it can charge from the grid or not. It will work as Self Use out of the charging period.

- For "Force Time Use" mode, there are 2 parameters that needs to be set.



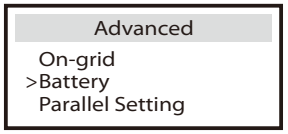
e) Relay Control
Relay Control is a reserved function which can control designated load intelligently by consuming the surplus energy when feed in power reaches certain value.
This function will require an external accessory "Smart Plug" which is being developed. For specific operation, please refer to " Smart Plug user manual".

f)Self Test (applies to CEI 0-21 only)
The self test function allows user to test the following items."ALL test", "Ovp(59.S2) test", "Uvp(27.S1) test", "Uvp(27.S2) test", "Ofp(81>.S1) test", "Ufp(81<.S1) test", "Ofp(81>.S2) test", "Ufp(81<.S2) test", "Ovp10(59.S1) test".
In the self test interface, user can test choose "ALL test" or individual test item.
Please make sure the inverter is grid-tied before testing test.
For all test, it needs about 6 minutes. And it will display"success" then "Pass" on the display.
For individual test item, it needs about several seconds or minutes.
Click test report to obtian all items test result.

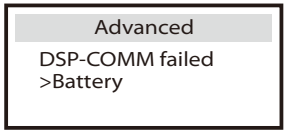


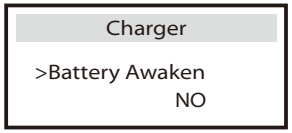
g) Advanced

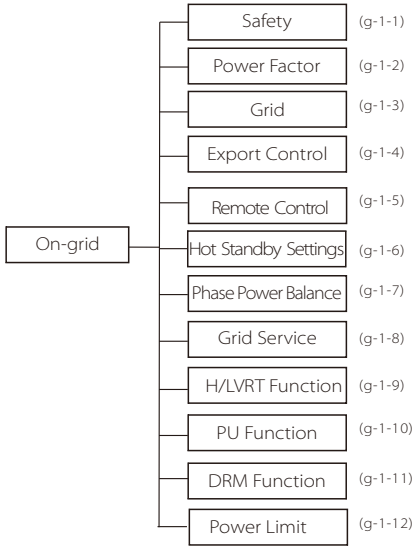
All the advanced settings can be set here, such as battery, grid, EPS and so on. "Advanced" includes six parts: On-grid, Battery, Parallel Setting, Reset, Meter Setting, New Password. The default user password is 0000. The installer password is 2014. Please contact your installer or SolaX support when you need to change any advanced setting here.



* When battery capacity ≤the set minimum capacity, inverter will trigger the Battery Awaken function.







g-1-1) Safety

User can set safety standard according to different countries and grid tied stanndards.There are 8 standards to select. (May change without notice)

Item	Standard	Country
1	VDE 0126	German
2	ARN 4105	German
3	AS 4777	Australia
4	G98/2	UK
5	EN 50438_NL	Netherland
6	CEI 0-21	Italy
7	IEC61727_In	India
8	EN 50549_EU	Netherland

g-1-2) Power Factor (For specific country if required by the local grid.)

There are 5 modes for selecting: Off , Under-Excited, Over-Excited, Curve, Q(u).

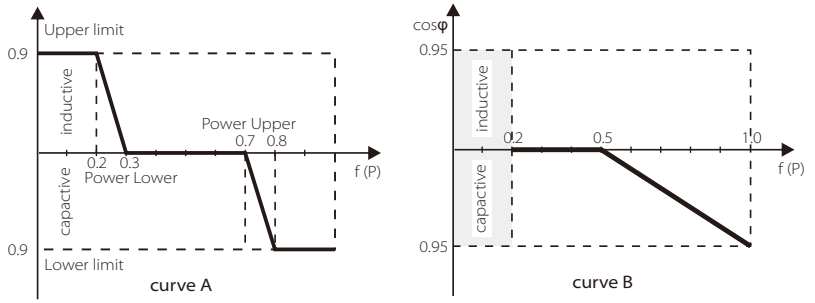
Mode	Comment
Off	–
Over-Excited	PF value
Under-Excited	PF value
Curve	Upper limit
	Lower limit
	Power Upper
	Power Lower
	PFLockInPoint (CEI 0-21 only)
	PFLockOutPoint (CEI 0-21 only)
Fixed Q Power	VoltRATIO 1 (AS4777.2 only)
	VoltRATIO 4 (AS4777.2 only)
	QURESPONSEV2 (AS4777.2 only)
Q(u)	QURESPONSEV3 (AS4777.2 only)
	QURESPONSEV4 (AS4777.2 only)
	K Value (CEI 0-21 only)

Reactive power control, Reactive standard curve cos φ = f(P)

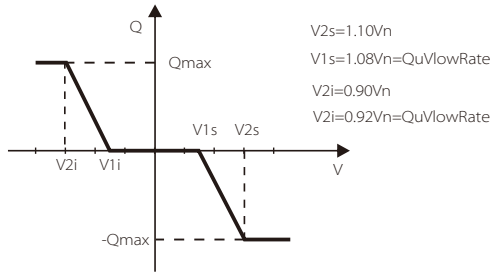
For VDE ARN 4105, curve cos φ = f(P) should refer to curve B. default value of setting is as shown in curve B.

For E 8001, curve cos φ = f(P) should refer to curve A. default value of setting is as shown in curve A.

For CEI 0-21, default value of PFLockInPoint is 1.05, when Vac > 1.05Vn, and Pac> 0.2 Pn, curve cos φ = f(P) should refer to curve B. Default value of PFLockOutPoint is 0.98, when Vac < 0.98 Vn, cos φ = f(P) will exit curve B.



Reactive power control, Reactive standard curve Q= f(V)

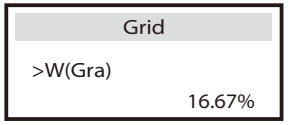


g-1-3) Grid

Usually there is no need to change any Grid parameter. It will come with default values according to the selected safety code. If you need to, please ask your installer or SolaX support to ensure it's complying with local grid regulation.

Parameter	Comment
Normally	
Vac upper	Voltage high protect
Vac lower	Voltage low protect
Vac upper slow	Voltage high slow protect
Vac lower slow	Voltage low slow protect
Fac upper	Frequency high protect
Fac lower	Frequency low protect
Fac upper slow	Frequency high slow protect
Fac lower slow	Frequency low slow protect
Vac 10m avg	10 min voltage high protect
Apply to Italy(CEI0-21) only.	
Ovp(59.S2)	Overvoltage protect fast time
Uvp(27.S2)	Undervoltage protect fast time
Ofp(81 > .S2)	Overfrequency protect fast time
Ufp(81 < .S2)	Underfrequency protect fast time
Ovp(59.S2)	Overvoltage protect slow time
Uvp(27.S1)	Undervoltage protect slow time
Ofp(81 > .S1)	Overfrequency protect slow time
Ufp(81 < .S1)	Underfrequency protect slow time
UFPL_StartPoint	Under Frequency power limit start point
OFPL_StartPoint	Over Frequency power limit start point
Apply to EN50438_NL only.	
OFPL_StartPoint	Over Frequency power limit start point
FreqDropRate	Frequency droop rate
Apply to EN50438_DK only.	
OFPL_StartPoint	Over Frequency power limit start point
T_Start	checking time set
FreqDropRate	Frequency droop rate
Apply to NZS4777.2 only.	
W(Gra)	Precentage of rated power per minute
Apply to EN50549_EU only.	
OFPL_StartPoint	Over frequency power limit start point
T_Start	checking time set
FreqDropRate	Frequency droop rate
UFPL_StartPoint	Under frequency power limit start point
UFPL_Setting	Under frequency power limit switch set
OFPL_Setting	Over frequency power limit switch set

W(Gra) (applies to NZS4777.2)
W(Gra) is Gradient of power rate limit which is required by standard NZS4777.2 and applies to NZS4777.2 only. This function is defined as a percentage of rated power per minute.
The default value is "enable". Choose "disable" means the function is turned off.

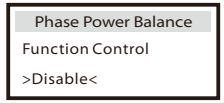


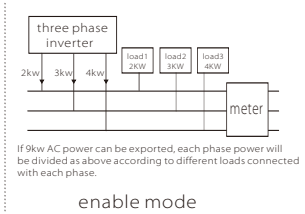
g-1-4) Export control
This function enables the inverter to control energy exported to the grid. Factory value is a default value, which can not be changed. User value is usually set by installer, it must be a value smaller than the factory value.
Note: For 0 Feedin control, please set the user value to 0.

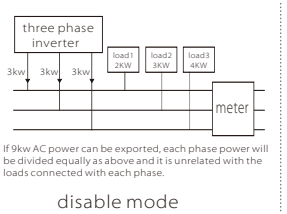
g-1-5) Remote control
This function allows external control device to make the inverters remote cluster control through RS485 port on the inverter. And it can control the inverter's active power output and reactive power output.
The default value is "Disable". If it can connect successfully, it will display "Connected". If not, it will display "Connecting". Select "Disable" means the function is turn off.

g-1-6) Hot standby setting
This function allows the inverter to stay standby. It can directly respond and work when load power is detected without self-check.
The default value is "Enable". Select "Disable" means the function is turn off.

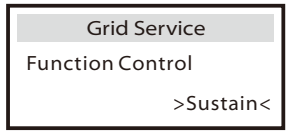
g-1-7) Phase Power Balance
This function controls the distribution of AC output power.
"Enable" means each phase will be divided according to the loads connected with each phase. "Disable", set as default, means each phase power will be divided equally.



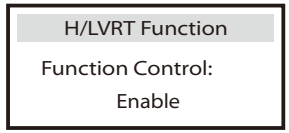




g-1-8) Grid Service
Grid Service can be selected from "Sustain" or "Stop". The default is "Sustain".
The safety requirements of battery storage inverter in each country may be different. User can select "Stop" to turn off these features if user receives legal permission.
"Sustain" means user switch on all option from safety and it is default setting.

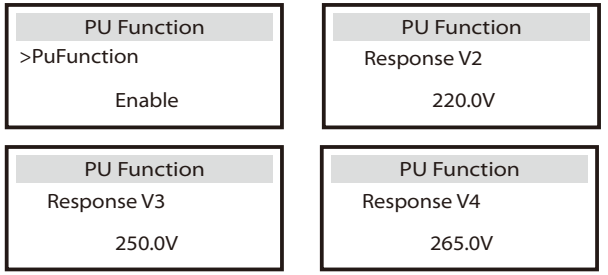


g-1-9) H/LVRT Function
When the grid appears unusual situation in a very short time, this function can keep the inverter in a no-power and no-alarm situation in such short period of time and recover to work immediately once the grid gets back to normal. The effective time is 800ms by default, but it will vary from the different safety code selected.
"Enable" means this function is turned on and it is the default setting.
"Disable" means such function is off.



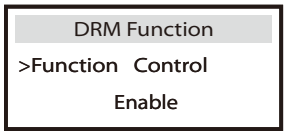
g-1-10) PU Function(For specific country if required by the local grid)

PU function is volt-watt response mode which is requried by some specific country standard such as AS4777.2. This function can control the inverter's active power according to grid voltage.
"Enable" means this function is turned on and it is the default setting.
"Disable" means such function is off.

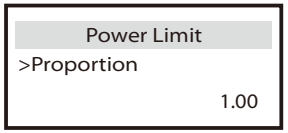


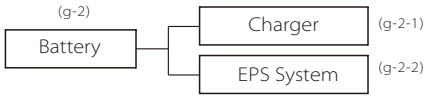
g-1-11) DRM Function(applies to NZS4777.2)

DRM function is Demand Response Mode which is required by standard NZS4777.2 and applies to NZS4777.2 only.
The default value is "enable". Choose "disable" means the function is turned off.



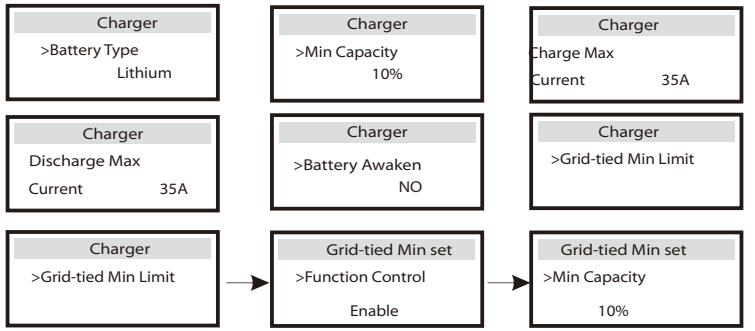
g-1-12)Power Limit
Power limit function is able to set AC port maximum power by percentage.



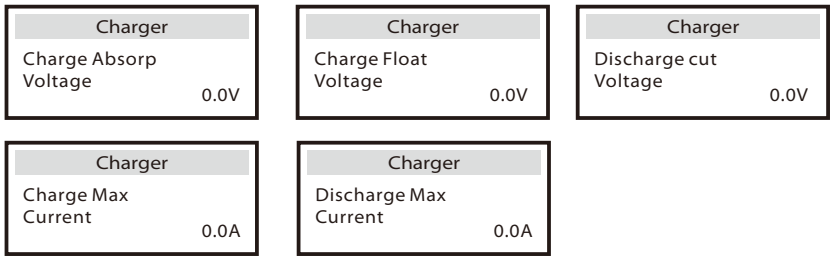


g-2-1) Charger
User can change the parameters of charger here. Battery type includes Lithium and Lead-acid. Users can set the charge & discharge parameters and awaken mode.
For the detailed parameters , please refer to the figures below.

For Lithium battery



For Lead-acid Battery



When the battery voltage reachs the value(discharge cut voltage for lead-acid battery, min capacity for lithium battery) in on-grid mode, battery will stop discharging and the system will go into IDLE mode.
When the battery voltage reachs this value(discharge cut voltage for lead-acid battery, min capacity for lithium battery) in off-grid mode, battery will stop discharging and the inverter will stop exporting power from EPS port with showing "BAT power low" on LCD display.
There are two ways to exit from "BAT power low".
-Press ESC button can exit from "BAT power low" manually.
-Enter EPS system setting page(refer to g-2-2 section) to exit from "BAT power low" automatically.

*Battery Awaken
- When the battery capacity is low, you may need to manually enable the Battery Awaken function.
Once enabled, the inverter will charge the battery when the grid is present. It will exit the Battery Awaken when battery voltage > discharge cut-off voltage + 10V or Battery Awaken last > 2 hours.
- When inverter is in Normal mode, and the battery power is sufficient, the inverter will not execute the Battery Awaken even if it's enabled.

Parameter	Comment
Min capacity *	The remaining minimum capacity of the battery.
Charge Max Current	The charge current can be set for 0-35A.
Discharge Max Current	The discharge current can be set for 0-35A.
Battery Awaken	When the battery capacity drops too low, enable this function manually the battery will charge from grid automatically.
Charge Absorp Voltage	When charging begins, it will enter constant votlage charging mode in order to accelerate charging speed. Please calculate this value based on lead-acid characteristic parameter.
Charge Float Voltage	It will switch to float charging mode after exiting constant voltage charging mode. Please calculate this value based on lead-acid characteristic arameter.
Discharge Cut Voltage	When the battery discharges to this value when grid is present, battery will stop discharging and the system will go into IDLE mode. When the battery voltage reachs this value when grid is off, battery will stop discharging and EPS output on inverter will stop with "BAT power low" shown on LCD display. To exit, you can press ESC button or enter EPS system setting page(refer to g-2-2 section).
Charge Max Current	Please calculate this value based on lead-acid characteristic parameter and inverter maximum charge current limination.
Discharge Max Current	Please calculate this value based on lead-acid characteristic parameter and inverter maximum discharge current limitation.

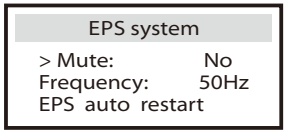
Note !
Please confirm the Inverter setting for maximum charge/discharge current is within the range of battery rated charge/discharge current.

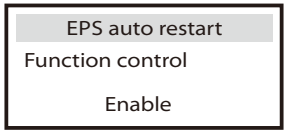
g-2-2) EPS system (For E Version only)
X3-Retro Fit inverter with E Version can work on the EPS mode.
EPS parameters can be set as below.
"Mute is to set the warning alert for EPS mode.
"No" means EPS buzzing alert is enabled.
"Yes" means EPS buzzing alert is disabled.
Besides, if the buzzing noise is sharp, it means EPS output is overloaded.
Frequency can be set to 50 or 60Hz based on your load loads.

"EPS auto restart" is used for restarting EPS output power manually or automatically.

- Choose "disable" means the EPS output power can only be restarted by pressing ESC button manually and it is the default value.
- Choose "enable" means the EPS output power can be restarted automatically through setting the "Min ESC Volt" (for lead-acid battery) or "Min ESC Soc" (for lithium battery).

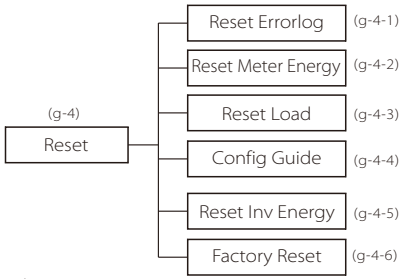
For example, if user chooses "enable" and set "Min ESC Soc" to 20%, it means PV power from other inverter in one system will charge the battery and when battery capacity reachs 20%, inverter will restart EPS output power and" BAT Power low" will disappear.



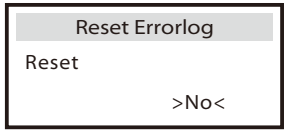


for lithium battery

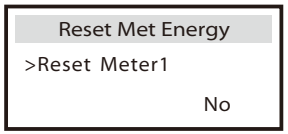
for lead-acid battery



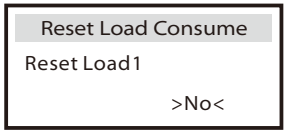
g-4-1) Reset Errorlog
Select "Yes" to reset all error records on the inverter.



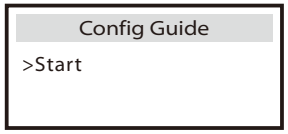
g-4-2) Reset Meter Energy
User can reset the meter energy record here.



g-4-3) Reset Load
User can reset the specific load's energy if the inverter is installed with a smart plug.

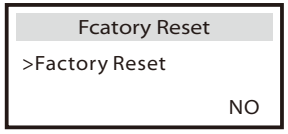


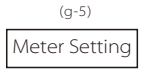
g-4-4) Config guide
This page will show the setup guide.



g-4-5) Reset Inv energy
Select "Yes" to reset all energy records on the inverter.

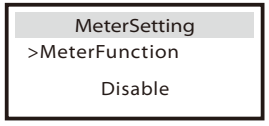
g-4-6) Factory reset
Select "Yes" to reset the inverter settings back to factory default.

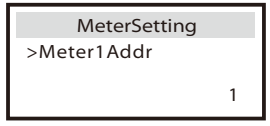




g-5) Meter Setting

X3-Retro Fit inverter with Energy meter connected can achieve hybrid functions. You can disable the meter function then it can work as a normal grid-tied inverter without PV and meter connected. In retro fit system, if you would like to monitor the other PV inverters as well, you can install meter on both X3-Retro fit and the others. The two meters shall have different address. Address 001 and address 002 are already written into meters by default, so do not make any change to the address except for specific situation.

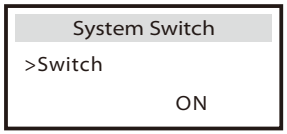




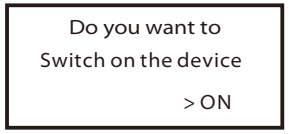
g-6) New Password
User can set the new password here.

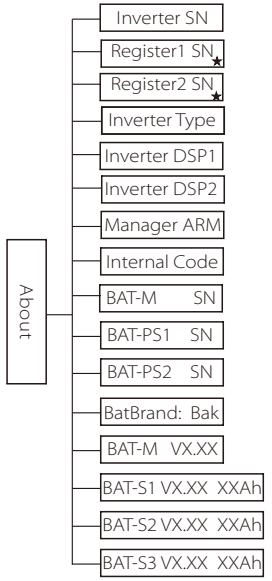
➢ System Switch

●"System Switch" has two options: ON or OFF.
"ON" means the inverter system is ON and work normally.
"OFF" means the inverter system is OFF, then there is no power generation or any communication with the external accessories or devices.



Press and hold the forth key named as "Enter", you can switch the system."ON"

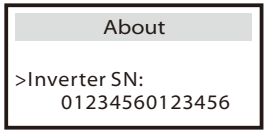


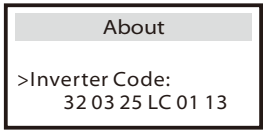


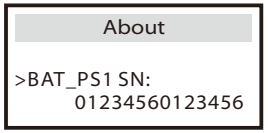
★Register1 SN: it indicates the serial number of the external monitoring devices,such as pocket WiFi, pocket LAN and pocket GPRS.
★Register2 SN: it indicates the serial number of built -in Ethernet.

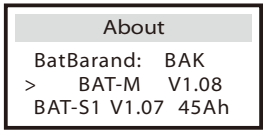
➢ About

●This interface shows basic information of the inverter, including inverter serial number, Register1 serial number, Register2 serial number, inverter type, master DSP1, manager ARM, internal code, Battery BMS version, Battery slave version and its capacity.









9. Troubleshooting

9.1 Troubleshooting

This section contains information and procedure for solving possible problems with X3-Retro Fit inverters, and provides you with troubleshooting tips to identify and solve most problems that could occur on the X3-Retro Fit inverters.
This section will help you narrow down the source of any problems you may encounter. Please read the following troubleshooting steps.
Check warnings or fault messages on System Control Panel or Fault codes on the inverter information panel. If a message is displayed, record it before doing anything further.
Attempt the solution indicated in below table.

Faults	Diagnosis and solution
TZ Protect Fault	Over current Fault. • Wait for a while to check if go back to normal status. • Disconnect the battery, reconnect it. • Or seek help from installer, if can not go back to normal state.
Grid Lost Fault	Grid is Lost. • Please wait for a while and system will reconnect if the utility is back to normal. • Please check whether the cable connection at AC side is normal or not. • Or seek help from installer.
Grid Volt Fault	Grid Voltage Out of Range • Please wait for a while and system will reconnect if the utility is back to normal. • Please check whether the grid voltage is in the normal range. • Or seek help from installer.
Grid Freq Fault	Grid Frequency Out of Range • System will reconnect if the utility is back to normal. • Or seek help from installer.
Bus Volt Fault	Bus Voltage Out of Normal Range • Disconnect the battery, reconnect it. • Or seek help from installer, if can not go back to normal state.
Bat Volt Fault	Battery Voltage Fault • Check if the battery input voltage is within the normal range • Or seek help from installer.

Faults	Diagnosis and solution
AC10M Volt Fault	The grid voltage is out of range for the last 10 Minutes. • The system will back to normal if the grid is back. • Or seek help from installer.
DCI OCP Fault	DCI over current protection Fault. • Wait for a while to check if back to normal. • Or seek help from installer.
DCV OVP Fault	DCV EPS over voltage protection Fault. • Wait for a while to check if back to normal. • Or seek help from installer.
SW OCP Fault	Over current fault detected by software. • Wait for a while to check if back to normal. • Turn off the battery and grid , reconnect them. • Or seek help from installer.
RC OCP Fault	Residual Current over current protection Fault. • Check the impedance of AC output. • Wait for a while to check if back to normal. • Or seek help from installer.
Isolation Fault	Isolation Fault • Please check if the insulation of electric wires are damaged. • Wait for a while to check if back to normal. • Or seek help from installer.
Temp Over Fault	Temperature over the limitation • Check if the envirement temperature is over limitation. • Or seek help from installer.
OverLoad Fault	Over Load in EPS Mode. • Turn off high power device , press "ESC" to restart the inverter. • Or seek help from installer, if can not go back to normal state.
EPS OCP Fault	Over Current in EPS Mode. • Make sure the load power is within the EPS power range. • Check if any nonlinear load is connect on the EPS. Remove this load to check if can recover. • Or seek help from installer, if can not go back to normal state.
FWunmatched	Firmware Version Fault • Check if the ARM version is matched. • Or seek help from installer, if can not go back to normal state.
BatPowerLow	• Turn off high power device , press "ESC" to restart the inverter. • Please charge the battery to a level greater than the protection capacity or the protection voltage.

Faults	Diagnosis and solution
PLL_OverTime Fault	PLL_OverTime Fault • Please check whether the AC connection is correct. • The system will back to normal if the grid is normal. • Or seek help from installer, if can not go back to normal state.
Parallel Fault	Parallel Fault • Parallel system has two or more master machine. • The DSP1 version is different. • Or seek help from installer, if can not go back to normal state.
Inter Com Fault	Internal Communication Fault • Turn off the battery and grid , reconnect them. • Or seek help from installer, if can not go back to normal state.
DSP System Fault	System Fault • Or seek help from installer, if can not go back to normal state.
AC HCT Fault	AC Current Sensor Fault • Turn off the battery and grid , reconnect them. • Or seek help from installer, if can not go back to normal state.
Inv EEPROM Fault	Inverter EEPROM Fault • Turn off the battery and grid , reconnect them. • Or seek help from installer, if can not go back to normal state.
RCD Fault	Residual Current Device Fault • Check the impedance of AC output. • Disconnect the battery, reconnect it. • Or seek help from installer, if can not go back to normal state.
EPS Relay Fault	EPS Relay Fault • Disconnect the battery, reconnect it. • Or seek help from installer, if can not go back to normal state.
Grid Relay Fault	GRID Relay Fault • Disconnect the grid and battery, reconnect them. • Or seek help from installer, if can not go back to normal state.
BMS_CellImblance	Battery CellImblance Fault • Please contact battery suppiler.
BMS_Hardware Protect	Battery Hardware Protect Fault • Please contact battery suppiler.
BMS_Interlock Fault	Battery Interlock Fault • Please contact battery suppiler.
BMS_Insulation Fault	Battery ISO Fault • Please contact battery suppiler.
BMS_VoltSensor Fault	Battery VolSen Fault • Please contact battery suppiler.
BMS_TempSensor Fault	Battery TempSen Fault • Please contact battery suppiler.
BMS_CurrSensor Fault	Battery CurSen Fault • Please contact battery suppiler.
InterComms Error	Mgr InterCom Fault • Turn off the battery and grid , reconnect them. • Or seek help from installer, if can not go back to normal state.

Faults	Diagnosis and solution
BMS_Relay Fault	Battery Relay fault • Please contact battery suppiler.
BMS_External_Err	Battery Fault-external fault • Please contact battery suppiler.
BMS_Internal_Err	Battery Fault-internal fault • Please contact battery suppiler.
BMS_OverVoltage	Battery Fault-overvoltage fault • Please contact battery suppiler.
BMS_LowerVoltage	Battery Fault-undervoltage fault • Please contact battery suppiler.
BMS_ChargeOCP	Battery Fault-charge overcurrent fault • Please contact battery suppiler.
BMS_DischargeOCP	Battery Fault-discharge overcurrent fault • Please contact battery suppiler.
BMS_TemLow	Battery Fault-under-temperature fault • Please contact battery suppiler.
NTC Sample Invilad	NTC Sample Invilad •Please confirm whether NTC sampling is installed correctly and connected, and whether NTC sampling is intact. •Please confirm whether the installation environment is normal •Or seek help from installer, if can not go back to normal state.
BMS_CellImblance	Battery Fault-cell imbalance fault • Please contact battery suppiler.
Mgr EEPROM Fault	Manager EEPROM Fault. • Turn off the battery and grid , reconnect them. • Or seek help from installer, if can not back to normal.
DSPunmatched	DSP Version Fault. • Please check if the DSP1 version is matched. • Or seek help from installer, if can not back to normal.
Meter Fault	Meter Fault. • Please check if the meter is in normal working. • Or seek help from installer, if can not back to normal.

● If your inverter's information panel is not displaying a Fault light, check the following list to make sure that the present state of the installation allows proper operation of the unit.

— Is the inverter located in a clean, dry, adequately ventilated place?
— Are the cables adequately sized and short enough?
— Are the input and output connections and wiring in good condition?
— Are the configurations settings correct for your particular installation?
— Are the display panel and the communications cable properly connected and undamaged?

Contact SolaX Customer Service for further assistance. Please be prepared to describe details of your system installation and provide model and serial number of the unit.

9.2 Routine Maintenance

There is no need to do maintenance or adjustments for inverters most of the time, but if the inverter produces less power or stops working due to overheating, it can be the following reason:
The cooling fins at the rear of the inverter may be covered with dirts.
Please clean the cooling fins with a soft dry cloth or brush if necessary.
Only trained and authorized professional personnel who are familiar with the requirements of safety was allowed to perform servicing and maintenance work.

➢ Safety checks

Safety checks should be performed at least every 12 months, please contact the installer or SolaX to arrange qualified person who has adequate training, knowledge, and practical experience to perform these tests.(Please kindly noted this action is not covered by warranty) The data should be recorded in an equipment log. If the device is not functioning properly or fails any of tests, the device has to be repaired. For safety check details, please refer to this manual on section 2 Safety instruction and EC Directives.

➢ Maintain Periodically

Only qualified personnel can perform the maintenance work. The correct operation steps are as follow:
1. Check whether the cooling fins at the rear of the inverter are covered by dirts, and the inverter should be cleaned when necessary. This work shall be checked from time to time.
2. Check whether the LED indicators, LCD display and touch keys of the inverter are in normal state. This check should be performed at least every 6 months.
3. Check whether the battery input and AC output wires are damaged or aged. This check should be performed at least every 6 months.
4. Then keep the inverter panels cleaned and their safety checked at least every 6 months.

10. Decommissioning

10.1 Remove the Inverter

- Disconnect the inverter from AC output.
- Wait for 5 minutes for de-energizing.
- Disconnect communication and optional connection wirings.
- Remove the inverter from the bracket.
- Remove the bracket if necessary.

10.2 Packaging

Please pack the inverter with the original packaging.
If the original package is no longer available, you can also use an equivalent carton that meets the following requirements.
- Suitable for loads more than 43kg.
- With handle.
- Can be fully closed.

10.3 Storage and Transportation

Store the inverter in dry environment where ambient temperature is always between -20 ℃ - +60 ℃. Take care of the inverter during the storage and transportation, and stack no more than 4 cartons in one .

When the inverter or other related components need to be disposed, please follow the local waste handling regulations. Please be sure to deliver wasted inverters and packing materials to the waste recycling site for disposal.