



# X3-Hybrid Series User Manual

5.0kw - 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

614.00364.03

### Copyright Declaration

The copyright of this manual belongs to SolaX Power Network Technology(Zhe jiang) Co., Ltd.. Any corporation or individual should not plagiarize, partially 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. reserves the right of final interpretation.

[www.solaxpower.com](http://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 PV Inverter ..... 14
  
- 4. Technical Data** ..... **15**
  - 4.1 DC input ( apply to version E, C ) ..... 15
  - 4.2 AC output/input ( apply to version E, C ) ..... 15
  - 4.3 Internal Charger ( apply to version E, C ) ..... 16
  - 4.4 Efficiency, Safety and Protection ( apply to version E, C ) ..... 16
  - 4.5 EPS output ( apply to version E only ) ..... 17
  - 4.6 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 PV Connection ..... 22
  - 6.2 Grid Connection ..... 24
  - 6.3 EPS Connection ( apply to E Version ) ..... 26
  - 6.4 On grid Parallel Connection ..... 30

6.5 Battery Connection ..... 34

6.6 Earth Connection(mandatory) ..... 39

6.7 Meter Connection ..... 40

6.8 LAN Connection ..... 43

6.9 DRM Connection ..... 44

6.10 Monitoring Connection(optional)..... 45

6.11 Inverter Manipulation ..... 46

**7. Firmware Upgrading ..... 48**

**8. Setting ..... 50**

8.1 Control Panel ..... 50

8.2 Menu Structure ..... 51

8.3 LCD Operation ..... 53

**9. Troubleshooting ..... 74**

9.1 Trouble Shooting ..... 74

9.2 Routine Maintenance ..... 78

**10. Decommissioning ..... 79**

10.1 Dismantling the Inverter ..... 79

10.2 Packaging ..... 79

10.3 Storage and Transportation ..... 79

**11 Disclaimer ..... 80**

# 1 Notes on this Manual

## 1.1 Scope of Validity

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

X3-Hybrid-5.0-N-E	X3-Hybrid-6.0-N-E	X3-Hybrid-8.0-N-E	X3-Hybrid-10.0-N-E
X3-Hybrid-5.0-D-E	X3-Hybrid-6.0-D-E	X3-Hybrid-8.0-D-E	X3-Hybrid-10.0-D-E
X3-Hybrid-5.0-N-C	X3-Hybrid-6.0-N-C	X3-Hybrid-8.0-N-C	X3-Hybrid-10.0-N-C
X3-Hybrid-5.0-D-C	X3-Hybrid-6.0-D-C	X3-Hybrid-8.0-D-C	X3-Hybrid-10.0-D-C

Note: **"5.0"** means 5.0kW.

**"D"** means with "DC Switch", **"N"** means without "DC Switch".

**"E"** means "EPS function" will be available with an external changeover device installed.

**"C"** means without "EPS function".

Store this manual where it will 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 voltages in the inverter!**

- All work must be carried out by qualified electrician.
- The appliance is not to be used by children or persons with 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.



**Note!**

**Grounding the PV generator.**

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



**Warning!**

- Ensure input DC voltage/current  $\leq$  Max. DC voltage/current
- Over voltage/current may cause permanent damage to inverter or other losses, which will not be included in warranty



**Warning**

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



**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.
- Accessories only together with the inverter shipment are recommended 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.
- PV modules shall have an IEC 61730 class A rating.
- Never touch either the positive or negative pole of PV connecting device. Strictly prohibit touching both of them at the same time.
- The unit contains capacitors that remain charged to a potentially lethal voltage after the MAINS, battery and PV supply has been disconnected. Hazardous voltage will present for up to 5 minutes after disconnection from power supply.
- CAUTION-RISK of electric shock from energy stored in capacitor, Never operate on the inverter couplers, the MAINS cables, Battery cables, PV cables or the PV generator when power is applied. After switching off the PV, battery and Mains, always wait for 5 minutes to let the intermediate circuit capacitors discharge before unplugging DC, battery inplug and MAINS couplers.
- When accessing the internal circuit of inverter, it is very important to wait 5 minutes before operating the power circuit or demounting the electrolyte capacitors inside the device. Do not open the device 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) to ensure that the device is discharged before beginning work (35VDC) inside the device.

► **Surge protection devices (SPDs) for PV installation**



**WARNING !**

Over-voltage protection with surge arresters should be provided when the PV power system is installed. We recommend that the grid connected inverter install SPDs in both PV input side and MAINS side.

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

Induced surges are the most likely cause of lightning damage in majority of installations, especially in rural areas where electricity is usually provided by long overhead lines. Surge may be included on both the PV array conduction and the AC cables leading to the building.

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 DC system, surge suppression device (SPD type2) should be fitted at the inverter end of the DC cabling and at the array located between the inverter and the PV generator, if the voltage protection level (VP) of the surge arresters is greater than 1100V, an additional SPD type 3 required for surge protection for electrical devices.

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.

All DC cables should be installed to provide as short a run as possible, and positive and negative cables of the string or main DC supply should be bundled together. Avoiding the creation of loops in the system. This requirement for short runs and bundling includes any associated earth bundling conductors.

Spark gap devices are not suitable to be used in DC circuits once conducting, they won't stop conducting until the voltage across their terminals is typically below 30 volts.

#### ► Anti-Islanding Effect

Islanding effect is a special phenomenon that grid-connected PV 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-Hybrid series 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 connection essential before connecting supply.

- 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.
  - Electrical installation of PV system shall comply with requirements of BS 7671 and IEC 60364-7-712.
  - 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-Hybrid series inverter should be worked with high voltage battery, for the specific parameters such as battery type, nominal voltage and nominal capacity etc., please refer to section 4.3.




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 personal with proper expertise can carry out the maintenance of accumulator 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 guidelines.
	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, mains and on-site PV generation suppliers.
	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 or the DC lid.

## 2.3 EC Directives

This chapter follows the requirements of the European low voltage directives, which contains the safety instructions and conditions of acceptability for the end user system, which you 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 instructions 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

In case of installation in PV system, start up of the unit (i.e. start of designated operation) is prohibited until it is determined that the full system meets the requirements stipulated in EC Directive (2014/35/EU, 2014/30/EU, etc.)

The grid connected inverter leave the factory completely connecting device and ready for connection to the mains and PV supply, the unit shall be installed in accordance with national wiring regulations. Compliance with safety regulations depends upon installing and configuring system correctly, including using the specified wires. The system must be installed only by professional assemblers who are familiar with requirements for safety and EMC. The assembler is responsible for ensuring that the end system complies with all the relevant laws in the country where it is to be used.

The individual subassembly of the system shall be interconnected by means of the wiring methods outlined in national/international such as the national electric code (NFPA) No.70 or VDE regulation 0107.

### 3 Introduction

#### 3.1 Basic Features

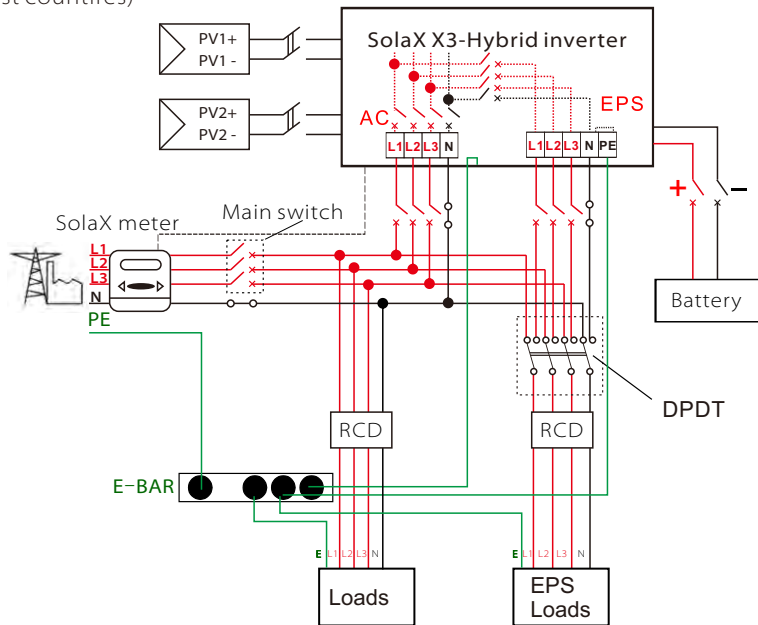
X3-Hybrid Seires is a high-quality inverter which can convert solar energy to AC energy and store energy into battery. Energy produced by inverter can be used to optimize self consumption, store in the battery for future use or feedin to public grid. Work mode depends on PV energy and user's preference. It can provide power for emergency use during the grid lost by using the energy from battery and inverter(generated from PV).

► System Diagram

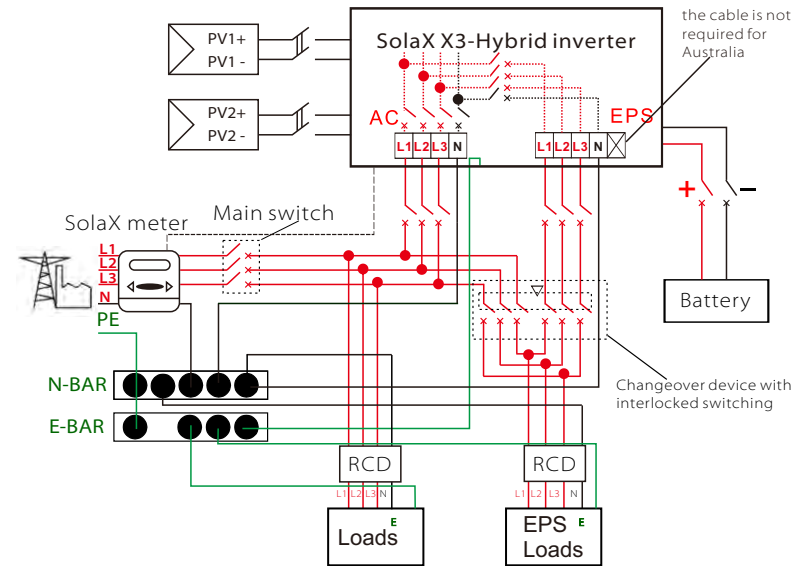
**E Version** applies to emergency use with external changeover device installed during the grid lost.

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 alternative supply must be disconnected after the grid is off. (applies to most countires)



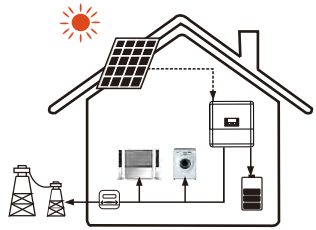
**Digram B** applies to the wiring rules which requires Neutral line of alternative supply must not be isolated or switched. (applies to wiring rules AS/NZS\_3000:2012 for Australia and New Zealand)



•Please control the home loads, and make sure it's within the "EPS output rating" under EPS mode, otherwise the inverter will shutdown with an "overload fault" warning.  
 •Please confirm with the mains grid operator whether there is any special regulations for grid connection.

### 3.2 Work Modes

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

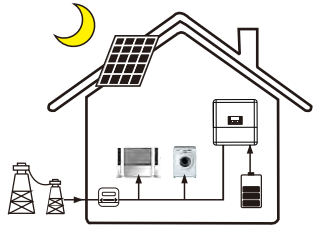


Work modes: **Self-use** (with PV Power)

**Priority: load>battery>grid**

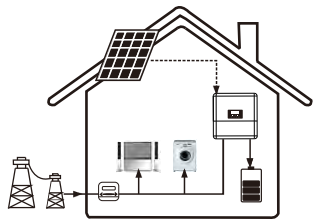
*This mode applies the area that has low feed-in tariff and high energy price.*

The PV generated power will be used to supply the local loads firstly, then to charge the battery. The redundant power will export to the public grid.



Work modes: **Self-use** (without PV Power)

When there is no PV supplied, battery will discharge for local loads firstly, and grid will supply power when the battery capacity is not enough.

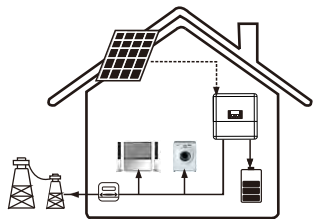


Work modes: **Force time use**

**Priority:battery>load>grid(when charging)**  
**Priority:load>battery>grid(when discharging)**

*This mode applies the area that has electricity price between peak and valley. User can use off-peak electricity to charge the battery.*

The charging time can be set flexibly, and it also allows to choose whether charge from the grid or not.



Work modes: **Feed in Priority**

**Priority:load>grid>battery**

*This mode applies the area that has high feed-in tariff and export control.*

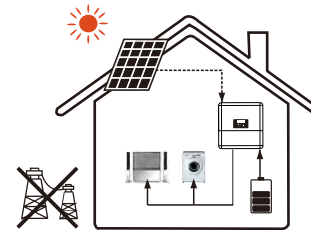
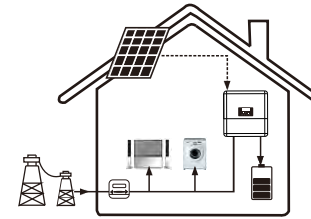
The PV generated power will be used to supply the local loads firstly, then export to the public grid. The redundant power will charge the battery.

Work modes: **Back up mode**

**Priority:battery>load>grid**

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

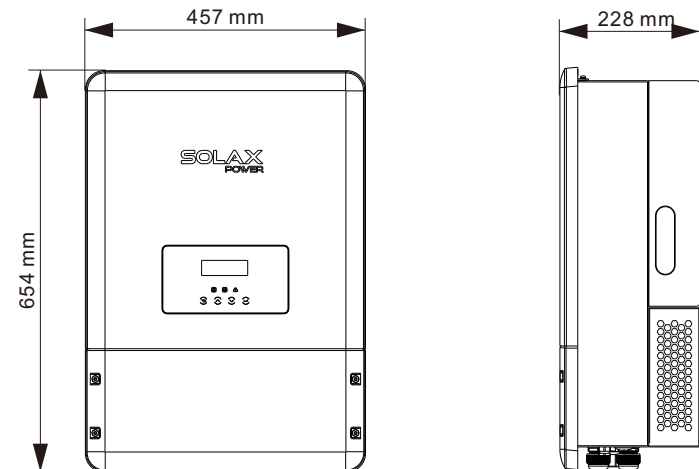
In this mode battery will be charging forcibly in the setting time and will **never be discharged** when the grid is on, and it also allows to choose whether charge from the grid or not.



**\* EPS Status**

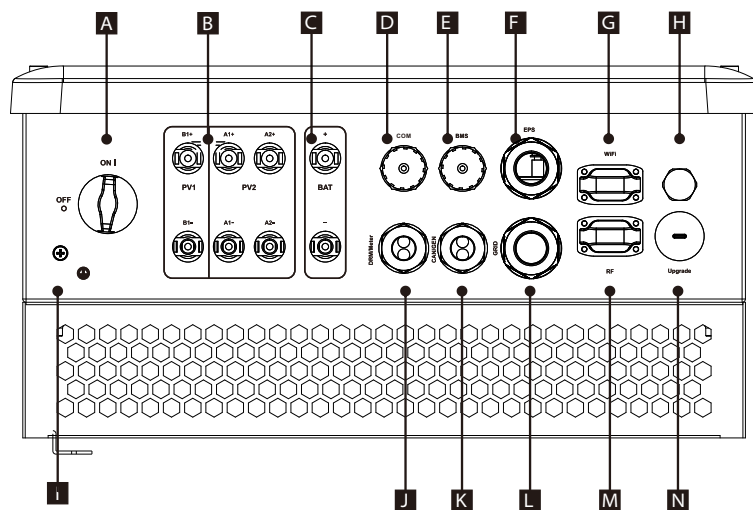
When the grid is off, system will supply emergency power from PV or battery to supply the home loads. (Battery is necessary in EPS mode.)

### 3.3 Dimension





### 3.4 Terminals of PV inverter



Object	Description
A	DC switch (optional)
B	PV connection area
C	Battery connection area
D	Ethernet port
E	Battery communication port
F	EPS output
G	WiFi port for external Pocket WiFi
H	Waterproof valve
I	Earthing screw
J	DRM/Meter port
K	CAN communication port for parallel operation/ GEN is a reserved port
L	Grid output
M	External port for smart plug
N	USB port for upgrading



**WARNING !**  
Qualified electrician will be required for the installation.

## 4. Technical Data

### 4.1 DC input

Model	X3-Hybrid-5.0-D	X3-Hybrid-6.0-D	X3-Hybrid-8.0-D	X3-Hybrid-10.0-D
	X3-Hybrid-5.0-N	X3-Hybrid-6.0-N	X3-Hybrid-8.0-N	X3-Hybrid-10.0-N
Max. recommended DC power [W]	A:3000/B:3000	A:4000/B:4000	A:6000/B:4000	A:8000/B:5000
Max. DC voltage[V]	1000	1000	1000	1000
Norminal DC operating voltage[V]	720	720	720	720
MPPT voltage range [V]	180-950	180-950	180-950	180-950
MPPT voltage range@full load [V]	230-800	280-800	270-800	330-800
Max. input current [A]	12/12	12/12	24/12	24/12
Max. short circuit current [A]	14/14	14/14	28/14	28/14
Start input voltage [V]	160	160	160	160
Start output voltage [V]	180	180	180	180
No. of MPP trackers	2	2	2	2
Strings per MPP tracker	A:1/B:1	A:1/B:1	A:2/B:1	A:2/B:1
Backfeed current to PV array	0	0	0	0
DC disconnection switch	optional			

### 4.2 AC output/input

Model	X3-Hybrid-5.0-D	X3-Hybrid-6.0-D	X3-Hybrid-8.0-D	X3-Hybrid-10.0-D
	X3-Hybrid-5.0-N	X3-Hybrid-6.0-N	X3-Hybrid-8.0-N	X3-Hybrid-10.0-N
<b>AC output</b>				
Norminal AC power[VA]	5000	6000	8000	10000
Max. apparent AC power[VA]	5500	6600	8800	11000
Rated grid voltage(range)[V]	400V/230VAC;380V/220VAC			
Rated grid frequency[Hz]	50/60			
Norminal AC current[A](@230VAC)	7.2	8.7	11.6	14.5
Max.AC current[A]	8.0	9.6	12.8	15.9
Displacement power factor	0.8 leading...0.8 lagging			
Total harmonic distortion(THDi)	< 3%			
Load control	Yes(optional)			
<b>AC input</b>				
Norminal AC power[VA]	5000	6000	8000	10000
Rated grid frequency[Hz]	50/60			
Rated grid frequency(range)[Hz]	47...53/57...63			
Norminal AC current[A] (@230VAC)	7.2	8.7	11.6	14.5
Max.AC current[A]	8.0	9.6	12.8	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			

### 4.3 Internal Charger

Model	X3-Hybrid-5.0-D	X3-Hybrid-6.0-D	X3-Hybrid-8.0-D	X3-Hybrid-10.0-D
	X3-Hybrid-5.0-N	X3-Hybrid-6.0-N	X3-Hybrid-8.0-N	X3-Hybrid-10.0-N
Battery type	Lithium battery/Lead-acid battery			
Battery voltage[V]	160-800(800 for Lithium battery)\500 for Lead-acid battery)			
Rated charge/discharge current[A]	25A			
Max. charge/discharge current[A]	25A			
Communication interfaces	CAN/RS485			
Reverse connet protection	Yes			
Over-current protection /Over-temperature protection	Yes			

### 4.4 Efficiency, Safety and Protection

Model	X3-Hybrid-5.0-D	X3-Hybrid-6.0-D	X3-Hybrid-8.0-D	X3-Hybrid-10.0-D
	X3-Hybrid-5.0-N	X3-Hybrid-6.0-N	X3-Hybrid-8.0-N	X3-Hybrid-10.0-N
MPPT efficiency	99.90%	99.90%	99.90%	99.90%
Euro efficiency	97.00%	97.00%	97.00%	97.00%
Max. efficiency	97.80%	97.80%	97.80%	97.80%
Max. battery charge/discharge efficiency	97.00%/96.00%	97.00%/96.00%	97.50%/96.50%	97.50%/96.50%
<b>Safety &amp; Protection</b>				
Over/under voltage protection	YES			
DC isolation protection	YES			
Monitoring ground fault protection	YES			
Grid protection	YES			
DC injection monitoring	YES			
Back feed current monitoring	YES			
Residual current detection	YES			
Anti-islanding protection	YES			
Over load protection	YES			
Over heat protection	YES			

### 4.5 EPS output ( apply to version E only)

Model	X3-Hybrid-5.0-D	X3-Hybrid-6.0-D	X3-Hybrid-8.0-D	X3-Hybrid-10.0-D
	X3-Hybrid-5.0-N	X3-Hybrid-6.0-N	X3-Hybrid-8.0-N	X3-Hybrid-10.0-N
EPS rated power[VA]	5000	6000	8000	10000
Max. EPS power[VA]	5000	6000	8000	10000
EPS rated voltage[v]	400V/230VAC, 380V/220VAC			
EPS rated current[A](@230VAC)	7.2	8.7	11.6	14.5
EPS peak power[W]	10000,60s	12000,60s	14000,60s	15000,60s
Switch time[s]	<1.5s			
Total harmonic distortion(THDv)	<2%			
Parallel operation	10			
MAX.output overcurrent protection[A]	48			

### 4.6 General Data

Model	X3-Hybrid-5.0-D	X3-Hybrid-6.0-D	X3-Hybrid-8.0-D	X3-Hybrid-10.0-D
	X3-Hybrid-5.0-N	X3-Hybrid-6.0-N	X3-Hybrid-8.0-N	X3-Hybrid-10.0-N
Dimension (W/H/D)[mm]	457*654*228			
Dimension of packing (W/H/D)[mm]	777*558*355			
Net weight [kg]	45	45	45	45
Gross weight [kg]	48	48	48	48
Installation	Wall-mounted			
Operating temperature range[°C]	-20~+60 (derating at 45)			
Storage temperature [°C]	-20~+60			
Storage/Operation relative humidity	0%~95%, (without condensation)			
Altitude [m]	<2000			
Ingress Protection	IP65(for outdoor use)			
Standby consumption[W]	200W for hot standby, 15W for cold standby			
Idle mode	YES			
Over Voltage Category	III(electric supply side), II(PV side)			
cooling	Nautral			
Inverter Topology	Transformerless			
Communication interface	Ethernet, Meter, WIFI(optional), RF(optional), DRM, USB, ISO alarm,GEN,CAN,BMS,NTC			
LCD display	Backlight 20*4 character			
Standard warranty	Standard 5 years(10 years optional)			
Button	Capacitive Touch Sensor			
Buzzer	1,inside(EPS & earth fault)			

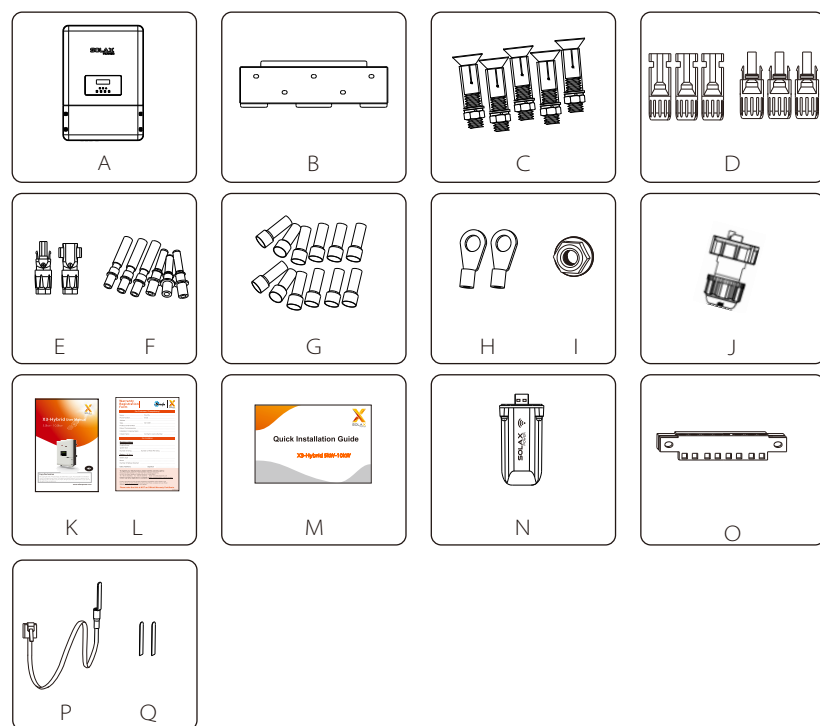
## 5. Installation

### 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 bolt (5)

D	PV connectors (3*positive, 3*negative)
E	Battery connectors (1*positive, 1*negative)
F	PV pin connectors (3*positive, 3*negative)
G	AC terminals/EPS terminals (optional)/Earth terminals (12)
H	Ring terminal (for grounding) (2)
I	Grounding nut
J	Waterproof connector with RJ45 (2*RJ45)
K	User manual
L	Warranty card
M	Quick installation guide
N	WiFi module (optional)
O	8 pin terminal for meter connection
P	NTC (optional)
Q	scotch tape(2)

### 5.3 Mounting

#### ➤ Installation Precaution

X3-Hybrid Series inverter is designed for outdoor installation (IP 65).

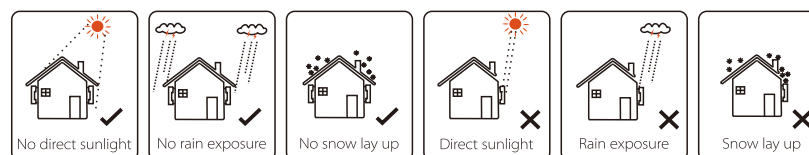
Make sure the installation site meets the following conditions:

- 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.
- Keep Dry-The package/product must be protected from excessive humidity and must accordingly be stored under cover.
- Under good ventilation condition.
- The ambient temperature in the range of -20 to +60 .
- The slope of the wall should be within  $\pm 5^\circ$  .

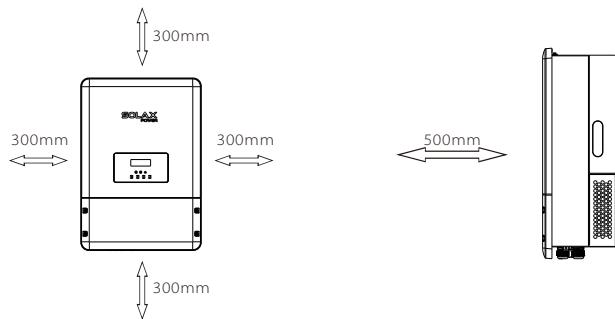
The wall hanging the inverter should meet conditions below:

- 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 AVOIDE 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  $\Phi 10$  driller.



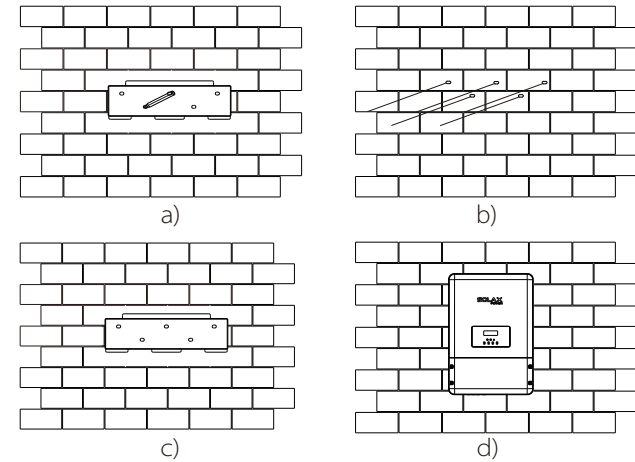
Step 1: Screw the wall bracket on the wall

- a) Use the wall bracket as a template to mark the position of the 5 holes on the wall.
- b) Drill holes with driller, make sure the holes are deep enough (at least 50mm) for installation, and then tighten the expansion tubes.
- c) Install the expansion pipe in the hole and tighten it. Then attach the expansion screws to the wall. ( $\Phi 10$  drilling machine. Power: 2.5 0.2 Nm)

Step 2: Install the screw holes on the wall with the screws.

d) Hang the inverter on the bracket, move the inverter close to the bracket and gently put down the inverter to ensure that the back plate and wall hanging plate on the machine are fixed.

$\Phi 10$  drilling machine. Power: 2.5  $\pm$  0.2



## 6. Electrical Connection

### 6.1 PV Connection

X3-Hybrid can be connected with PV modules in series with 2 MPPTS for 5.0KW, 6.0KW, 8.0KW and 10.0KW.

Select PV modules with excellent function and reliable quality. Open-circuit voltage of module arrays connected in series should be under Max. DC input voltage; operating voltage should be conformed to MPPT voltage range.

The configuration current should be under the maximum DC input current.

Max.DC Voltage Limitation

Model	X3-Hybrid-5.0-D	X3-Hybrid-6.0-D	X3-Hybrid-8.0-D	X3-Hybrid-10.0-D
	X3-Hybrid-5.0-N	X3-Hybrid-6.0-N	X3-Hybrid-8.0-N	X3-Hybrid-10.0-N
Max. DC Voltage (V)	1000			
MPPT Voltage Range(V)	180-950			



**Warning!**

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



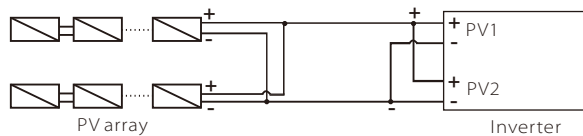
**Note!**

- Please choose a fitting external DC switch if the model (X3-Hybrid-5.0-N, X3-Hybrid-6.0-N, X3-Hybrid-8.0-N, X3-Hybrid-10.0-N) is purchased.
- The following requirements of PV modules need to be applied for each input area;
  - Same type
  - Same quantity
  - Identical alignment
  - Identical tilt
 Please do not make PV positive or negative ground!
- In order to save cable and reduce the DC loss, we suggest to install the inverter near PV modules.

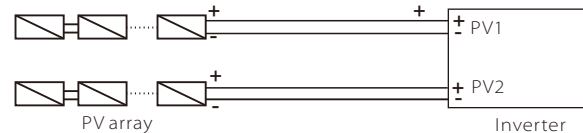


**Note!**

PV connection mode below is NOT allowed!



PV connection mode below is allowed!



### Connection Steps:

**Step1. Checking PV module.**

- 1.1 Use multimeter to measure module array voltage.
- 1.2 Check the PV+ and PV- from the PV string combiner box correctly.
- 1.3 Please make sure the impedance between the positive pole and negative pole of PV to earth should be MΩ level.

**Step2. Separating the DC connector.**

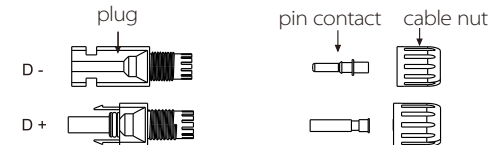
**Step3. Wiring.**

- 3.1 Choose the 12 AWG wire to connect with the cold-pressed terminal.
- 3.2 Remove 10mm of insulation from the end of wire.
- 3.3 Insert the insulation into pin contact and use crimping plier to clamp it.

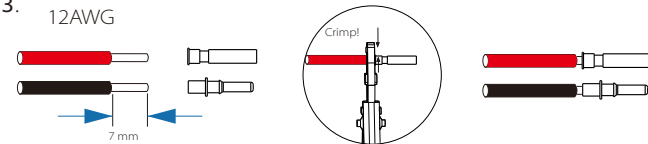
**Step4. Insert pin contact through the cable nut to assemble into back of the male or female plug. When you feel or hear a “click” sound the pin contact assembly is seated correctly.**

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

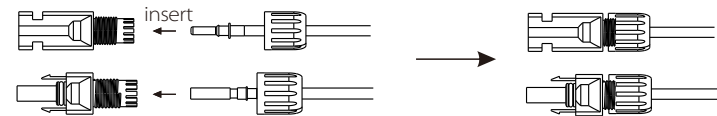
**Step2.**



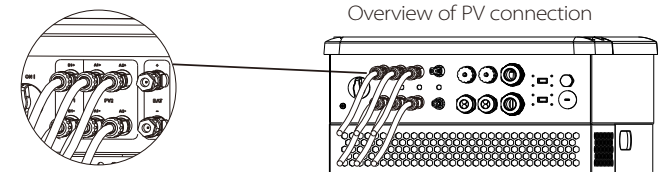
**Step3.**



**Step4.**



**Step5.**



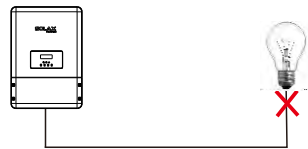
## 6.2 Grid Connection

X3-Hybrid 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-Hybrid-5.0-D X3-Hybrid-5.0-N	X3-Hybrid-6.0-D X3-Hybrid-6.0-N	X3-Hybrid-8.0-D X3-Hybrid-8.0-N	X3-Hybrid-10.0-D X3-Hybrid-10.0-N
Cable	4-5mm	4-5mm	4-5mm	5-6mm
Micro-breaker	20A	20A	25A	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.

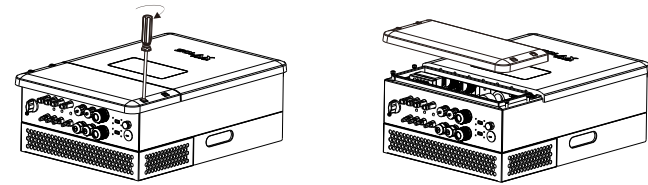
#### Step2. Remove the down-top cover from the inverter.

#### Step3. Make AC wires.

- 3.1 Choose the appropriate wire(Cable size: refer to Table 4).
- 3.2 Reserve about 60mm of conductor material 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 Compress the AC terminal head by using a crimping pliers and screw down screw cap tightly.

**Step4.** Insert AC cable into Grid port through screw cap and then tighten the screw cap. Insert L1,L2,L3 wire and N wire into corresponding ports of AC terminal. Compress the PE wire with earth terminal, then screw it on the grounding stud.

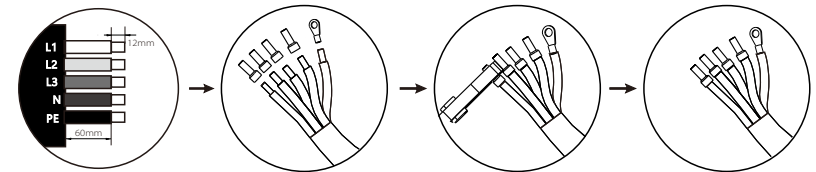
#### Step2.



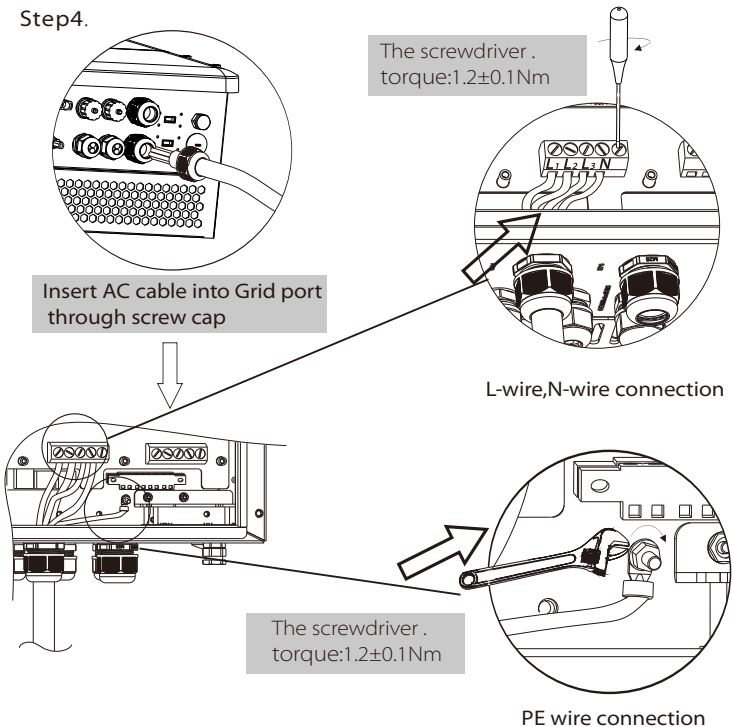
Φ4 hexagon wrench.torque:3±0.1Nm

#### Step3.

Cable Size: Refer to Tabel 4(page 24)



#### Step4.



### 6.3 EPS Connection( apply to E Version)

X3-Hybrid 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 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, it will need to be installed an external switch. Please refer to specific wiring diagram below or as described in quick installation guide.

For automatical solution, please contact our sales.

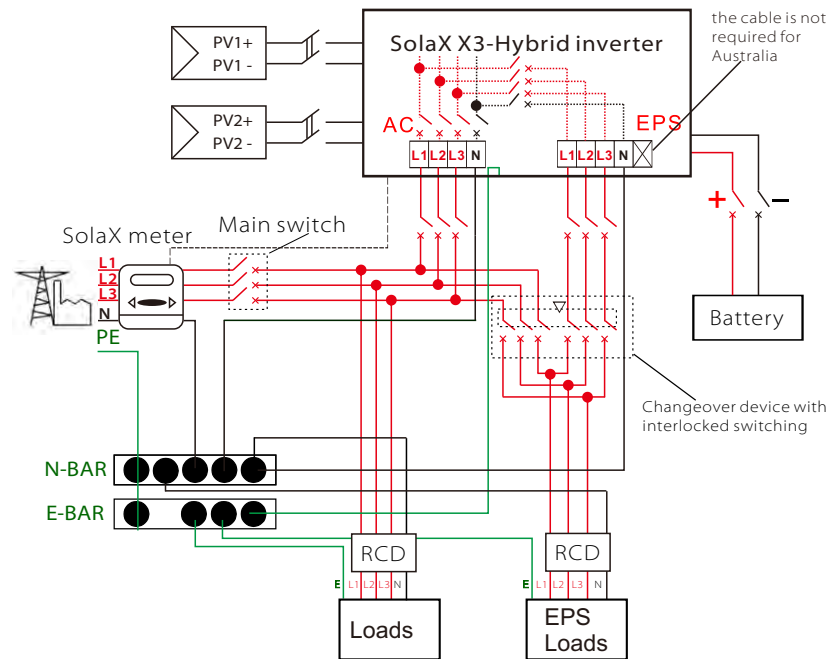
#### EPS wiring diagram

The below diagram are for reference based on different local wiring rules, please follow the local rules for the external wiring to choose suitable wiring mode.

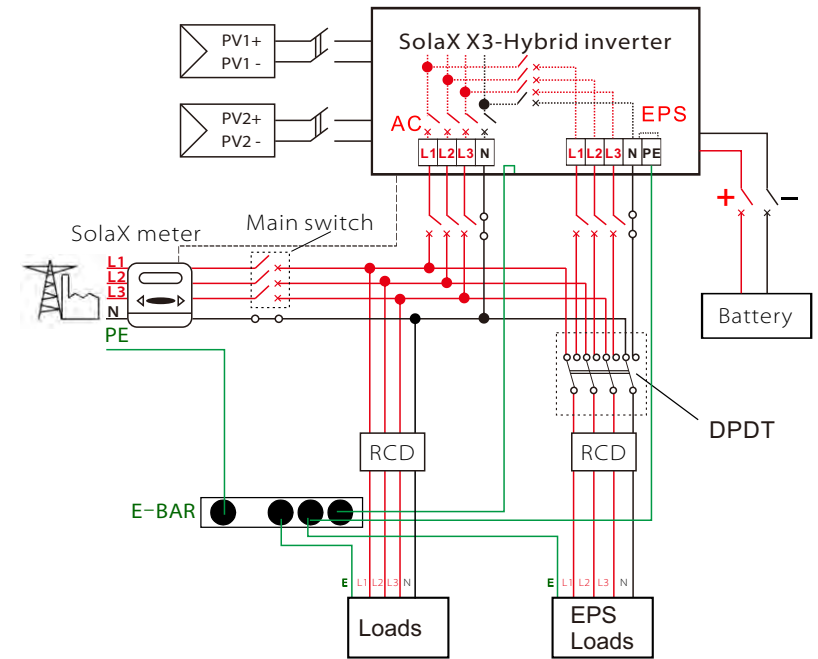
**Diagram A** : Neutral line of alternative supply must not be isolated or switched.

**Diagram B** : Neutral line of alternative supply can be isolated or switched.

Digram A • E Version • For AU/NZ



Digram B • E Version • For Other Countries



Please contact our sales for any compatible contactor purchase requirement .



**Note!**

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

➤ Connection Steps:

**Step1.** Make EPS wires.

- 1.1 Choose the appropriate wire (cable size: refer to picture below).
- 1.2 Reserve about 60mm of conductor material sectional area.
- 1.3 Remove 12mm of insulation from the end of wire.
- 1.4 Insert stripped wires into AC terminal and insure all conductor strands are captured in the AC terminal.
- 1.5 Compress 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 the screw cap. Insert L1,L2,L3 wire, N wire and PE wire (PE wire does not apply to Australia) into corresponding ports of EPS terminal and screw them tightly.

**Step1.**

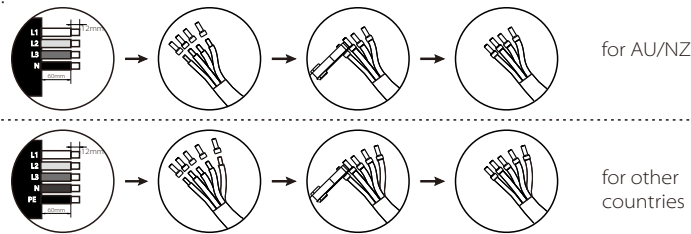
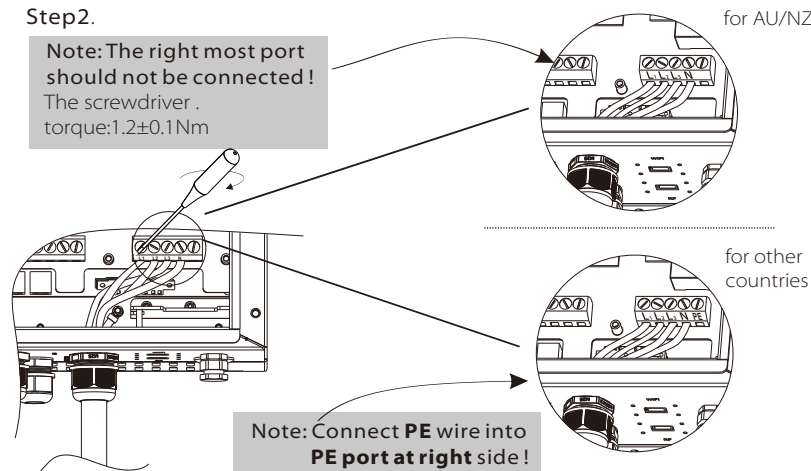


Table 5 Cable and Micro-breaker recommended

Model	X3-Hybrid-5.0-D X3-Hybrid-5.0-N	X3-Hybrid-6.0-D X3-Hybrid-6.0-N	X3-Hybrid-8.0-D X3-Hybrid-8.0-N	X3-Hybrid-10.0-D X3-Hybrid-10.0-N
EPS Cable	5mm	5mm	5mm	5mm
EPS breaker	25A	25A	32A	32A

**Step2.**



➤ Requirements for EPS load



**WARNING !**

Make sure the EPS load power rating is within EPS output rating, otherwise the inverter will shutdown with an "over load" warning.

When an "over load" is appeared, adjust the load power 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.

Configuration current less than the maximum dc input current, generally lithium and lead acid capacity and voltage are linear decline.

Below table shows some common feasible loads for you reference.

Note: Please check with the manufacturer for high power inductive load.

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

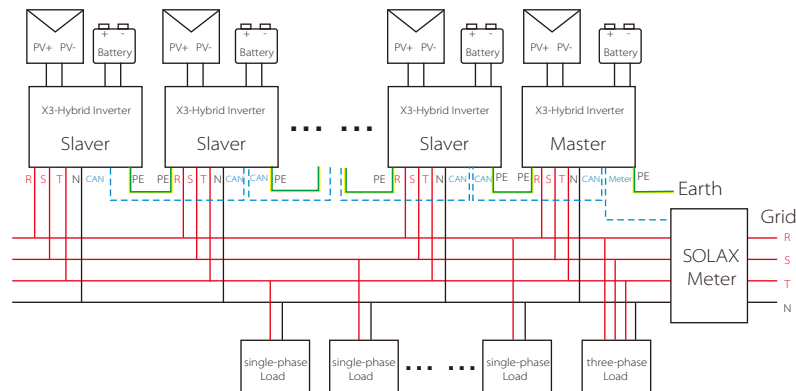


### 6.4 On-Grid Parallel Connection

X3-Hybrid 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 other slaver inverter communicate with "Master inverter" by CAN communication-parallel connection.

**Note!**  
Please note that the parallel connection function can only be used in the case of grid connection. The off-grid parallel connection function currently supports up to 5 units, and the off-grid parallel connection function is still under development for 10 units.

#### 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.

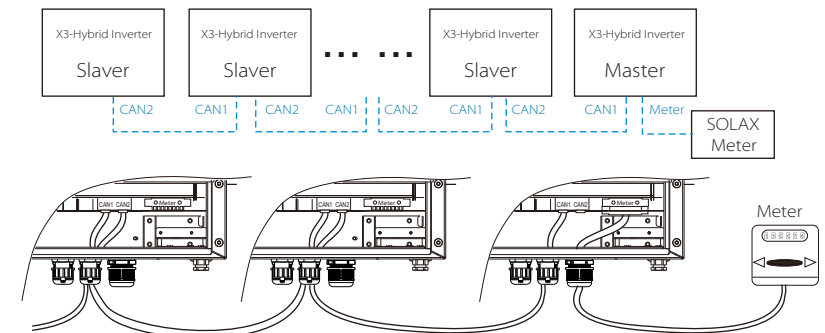
Free mode	Only if no one inverter is set as a "Master", all inverters are in free mode in the system.
Master mode	When one inverter is set as a "Master", this inverter enters master mode. Master mode can be changed to free mode or slaver mode by LCD setting.
Slaver mode	Once one inverter is set as a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

Step1: Connect all inverters' communication together by connecting network cables between CAN ports.

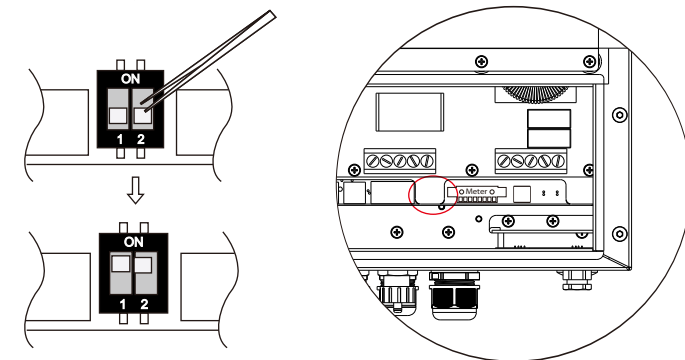
- Use standard CAT7 network cables for CAN-CAN connection and CAT5 cable for CAN-Meter connection.
- Insert one side of CAT7 cable into the first inverter's CAN port and the other side into the next inverter's CAN port.
- Insert one side of CAT5 cable into the Meter port of meter, and the other side into the CAN 1 port the first inverter or the CAN 2 port of the last inverter.
- ( Note: PV and battery should both be connected to the inverter with meter cable plugged.)



Step2: Set the DIP switch (No need to set all inverter's DIP switch).

- Find the inverter with meter cable plugged.
- Remove the top-down cover from this inverter, 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 tweezers.

(Note: Please pay attention to the position of the DIP switch, which is very small)



Step3: Find the inverter connected with the meter ,then enter setting page of the inverter LCD display, then click parallel setting, and choose "Master".



➤How to exit from parallel system

If one inverter wants to exit from this parallel system, please do the steps as below:

-step1: Disconnect all the network cables on the CAN port.

-step2: Enter setting page and click parallel setting, and choose "Free".

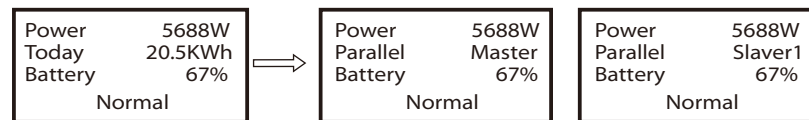
**Note!**

- 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

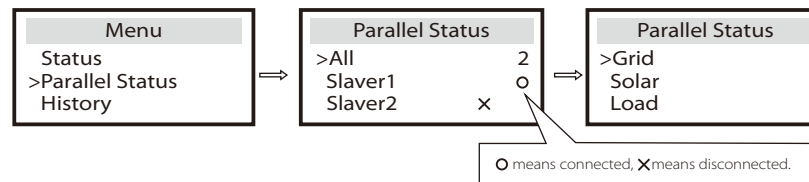
**Main display:**

Once inverter enters parallel system, the "today yield" will be replaced by " Inverter Class", and parallel relevant fault has a higher priority than other faults and will be showed firstly on main display.



**Status display:**

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



➤Parallel Control Function

Master inverter has an absolute lead in the parallel system to control all slaver inverter's energy management and dispatch control. Once master inverter has some error and stop working, all slaver inverter will be stoped simultaneously. But master inverter is independent of all slaver inverters to work and will not be affected by slaver inverter's fault.

Overall system will be running according to master inveter's setting parameters, and most setting parameters of slaver inverter will be kept but not be excuted. Once slaver inverter exit from system and be running as an independent unit, its all setting will 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 ( long press ESC button on LCD ).

**Safety setting:**

System safety protection is excuted by master inverter's safety. Slaver inverter protection mechanism will only be triggered by master inverter's instructions.

**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:**

All sets about power factor are all for the overall system and the corresponding sets of slaver inverter are invalid.

**Remote control setting:**

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

### 6.5 Battery Connection

Charging & discharging system of X3-Hybrid series inverter is designed for **high-voltage lithium battery and lead-acid battery.**

Before choosing battery, please note the maximum voltage of battery can not exceed **800V** , and the battery communication should be compatible with X3-Hybrid inverter.

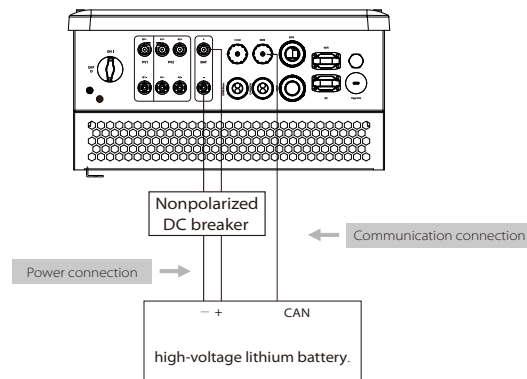
*Please X3-Hybrid inverter can also work with lead-acid battery, and the maximum voltage of battery can not exceed **500V**. For a more detailed explanation, please refer to Important Instructions for lead-acid battery.*

#### ➤ Battery breaker

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

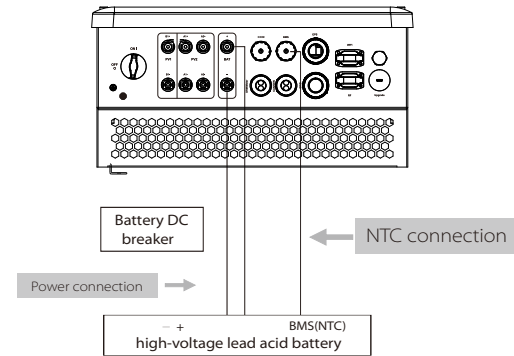
Model	X3-Hybrid-5.0-D X3-Hybrid-5.0-N	X3-Hybrid-6.0-D X3-Hybrid-6.0-N	X3-Hybrid-8.0-D X3-Hybrid-8.0-N	X3-Hybrid-10.0-D X3-Hybrid-10.0-N
Voltage	Nominal voltage of DC breaker should be larger than maximum voltage of battery.			
Current[A]	32A			

#### ➤ 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.

### Lead-acid battery connection diagram



#### ➤ Communication PIN Definition

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

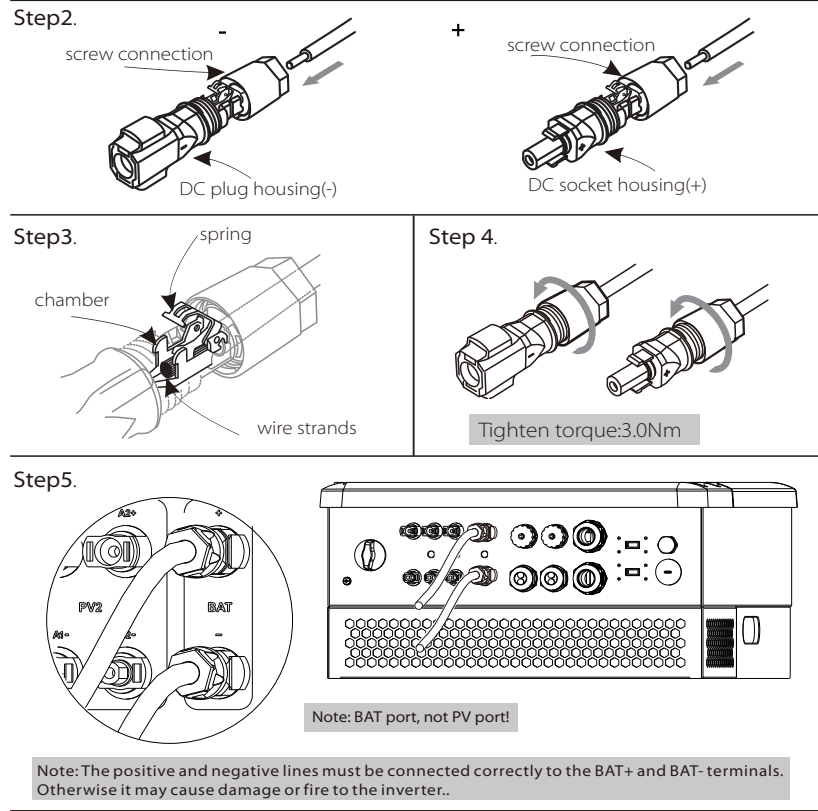
Note :For lithium batteries, the BMS PIN is 4/5/6/7/8, for Lead acid battery, NTC PIN is 1.

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

**Note**  
 The lithium battery communication can only work when the battery BMS is compatible with the inverter. The lead acid battery controls the inverter charging and discharging by NTC temperature sensing.

#### ➤ Power Connection Steps:

- Step1.** Choose the 9 AWG wire and strip the cable to 15mm.
- Step2.** Insert the stripped cable up to the stop ( negative cable for DC plug(-) and positive cable for DC socket(+) are live). Hold the housing on the screw connection.
- Step3.** Press down spring until it clicks audibly into place.(The live wire must be visible in the chamber)
- Step4.** Tighten the screw connection(tighten torque:3.0Nm)
- Step5.** Plug the battery connectors into the corresponding BAT port of inverter.



➤ **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.
- Battery BMS module port(Pylontech: RS485 port; Triple Power: CAN port; Please check the battery manual for more details).

