



X3 Series User Manual

30.0KW/36.0KW



EN

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Contents

1 Notes 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 Appropriate Usage	04
2.2 Important Safety Instructions	05
2.3 Explanation of Symbols	06
2.4 CE Directives	09
3 Introduction	10
3.1 Basic Features	10
3.2 Terminal of PV Inverter	10
3.3 Dimensions	11
4 Technical Data	12
4.1 DC Input	12
4.2 AC Output	12
4.3 Efficiency, Safety and Protection	13
4.4 General Data	13
5 Installation	14
5.1 UnPacking	14
5.2 Check for Transport Damage	15
5.3 Installation Precaution	16
5.4 Preparation	17
5.5 Installation Steps	18
5.6 Connections of The PV Power System	19
5.7 Run The Inverter	30

6 Internet Monitoring Function -----31

 6.1 Connect and log on ----- 31

 6.2 Menu structure -----31

 6.3 Internet operation-----32

7 Troubleshooting -----37

 7.1 Trouble Shooting-----37

 7.2 Routine Maintenance-----39

8 Decommissioning ----- 41

 8.1 Dismantling The Inverter -----41

 8.2 Packaging -----41

 8.3 Storage -----41

 8.4 Disposal-----41

1 Notes on this Manual

1.1 Scope of Validity

This manual is an integral part of inverter, it describes the assembly, installation, commissioning, maintenance and failure search of the below inverters. Please read it carefully before operating.

X3-30.0-T-D X3-36.0-T-D

X3-30.0-T-N X3-36.0-T-N

Note: "30.0" means 30kW. "T" means "double" MPPT string. "D" means with "DC Switch", "N" means without "DC Switch".

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, will result in death or serious injury.



CAUTION!

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



NOTE!

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

2 Safety

2.1 Appropriate Usage

The X3 Series is a PV inverter which converts the DC current of a PV generator into AC current and feeds it into the public grid.

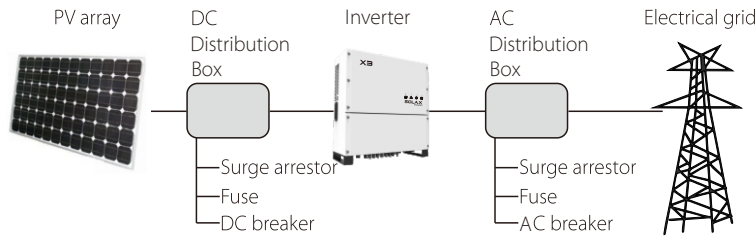



figure1

Surge protection devices (SPDs) for PV installation



WARNING!
Over-voltage protection with surge arresters should be provided when the PV power system is installed. The grid connected inverter is not fitted with SPDs in both PV input side and MAINS side.

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

Induced surges are the more likely cause of lightning damage in the majority of installations, especially in rural areas where electricity is usually by long overhead lines. Surge may be induced on both the PV array conduction and the a.c 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 d.c. system, surge suppression device (SPD type 2) should be fitted at the inverter end of the d.c. 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 a.c system, surge suppression devices (SPD type 2) should be fitted at the main incoming point of a.c supply (at the consumer's cutout), located between the inverter and the meter/distribution; SPD (test impulse D1) for signal line according to EN 61643-21.


All d.c. cables should be installed to provide as short runs as possible, and positive and negative cables of the same string or main d.c. 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 d.c. circuits as once conducting they won't stop conducting until the voltage across their terminals is typically more than 30 volts.

2.2 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. SolaX recommends connecting the generator frame and other electrically conductive surfaces in a manner which ensures continuous conduction and ground these in order to have optimal protection of system and persons.




When using the product, please do remember the below information to avoid the ?e, lightning or other personal injury

WARNING!
 Ensure input DC voltage \leq Max. DC voltage. Over voltage may cause permanent damage to inverter or other losses, which will not be included in warranty! This chapter contains important safety and operating instructions. Read and keep this Operation Guide for future reference.



WARNING!
 Authorized service personnel must disconnect both AC and DC Power from the X3 Series inverter before attempting any maintenance or cleaning or working on any circuits connected to the X3 Series inverter.



- Read all instructions, cautionary markings on the inverter, and all appropriate sections of this manual before using this inverter.
- Use only attachments recommended or sold by SolaX.
- Make sure that existing wiring is in good condition and that wire is not undersized. Do not operate the X3 Series inverter with damaged or substandard wiring.
- Do not disassemble the X3 Series inverter. It contains no user-serviceable parts. See Warranty for instructions on obtaining service. Attempting to service the X3 Series 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 fe 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.

2.3 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	Light color	Meaning of the light
	Blue	The inverter is in normal state.
	Yellow	There are some problems, but the inverter still can run normally.
	Red	There are some serious problems, please inform your installer immediately.
	Yellow(flicker)	The inverter is in a state of being monitored.

table1 symbols on the inverter

• Symbols on the Type Label












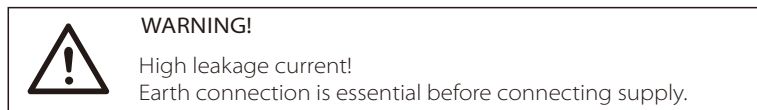
Symbol	Explanation
	CE mark The inverter complies with the requirements of the applicable CE guidelines.
	TUV certified
	RCM remark
	SAA certification
	Beware of hot surface The inverter can become hot during operation. Avoid contact during operation
	Danger of high voltages Danger to life due to high voltages in the inverter!
	Danger Risk of electric shock!
	Observe enclosed documentation
	The inverter can not be disposed of together with the household waste. Disposal information can be found in the enclosed documentation.
	Don't work on this inverter until it is isolated from both mains and on-site PV generation suppliers
	Danger to life due to high voltage There is residual voltage in the inverter which needs 45 min to discharge. Wait 45 min before you open the upper lid or the DC lid.

table2 Symbols on the type label

• PE Connection and leakage current

- The end-use application shall monitoring of the protective conductor by residual current operated protective device(RCD)with rated fault current $I_{fn} \leq 100\text{mA}$ which automatically disconnects the device in case of a fault.
- DC differential currents are created (caused) by insulation resistance and through capacities of the PV generator. In order to prevent unwanted triggering during operation, the rated residual current of the RCD has to be min 100mA.
- The device is intended to connect to a PV generator with a capacitance limit of approx 700nf.



- Incorrect grounding can cause physical injury, death or equipment malfunction and increase electromagnetic interference.
- Make sure that grounding conductors 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 DC 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 requirement of BS 7671.
- Electrical installation of PV system shall comply with the requirements of BS 7671 and IEC60364-7-712.
- No protection setting can be altered.
- User shall ensure that the equipment is so installed properly, design and operated to maintain at all times comply with the requirements of ESQCR 22(1)(a).

For Australia and New Zealand:

- The installation of inverter must fulfill Australia National Wiring rules AS/NZS3100,AS/NZS4777.2 and AS/NZS5033.
- Never touch either the positive or negative pole of PV connecting device. And never ever touch both at the same time.
- The unit contains capacitors that remain charged to a potentially lethal voltage after the MAINS and PV supply has been disconnected.
- Hazardous voltage will present for up to 45 minutes after disconnection from power supply.

- CAUTION-RISK of electric shock from energy stored in capacitor, never work on the solar inverter coupler, the MAINS cable, PV cables or the PV generator when power is applied. After switching off the PV power and Mains, always wait for 15 minutes to let the intermediate circuit capacitors discharge before you unplug DC input and MAINS couplers.
- When access to internal circuit of solar inverter, it is very important to wait 45 minutes before working on power circuit or demounting the electrolyte capacitors inside the device. Do not open the device by hand since the capacitors require this long to discharge sufficiently!
- 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.

2.4 CE Directives

This chapter follows the requirements of the European low voltage directives, which contains the safety instructions and conditions of acceptability for the endues 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, startup 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 wies. 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

Congratulations on your purchase of a X3 Series inverter from SolaX. The X3 inverter is one of the finest inverter on the market today, incorporating state-of-the-art technology, high reliability, and convenient control features.

- Advanced DSP control technology.
- Utilize the latest high-efficiency power component.
- Optimal MPPT technology.
 - Two independent MPPT technology.
 - Wide MPPT input range.
- Advanced anti-islanding solutions.
- Anti-theft protection.
- IP65 protection level.
- Max efficiency up to 98.6%,EU efficiency up to 98.3%.
- THD <2%
- Safety&Reliability: transformerless design with software and hardware protection.
- Friendly HMI.
 - LED status indications.
 - RS485, dry contact , LAN communication and WiFi interface.
 - USB upgrade.
 - PC remote control.

3.2 Terminal of PV inverter

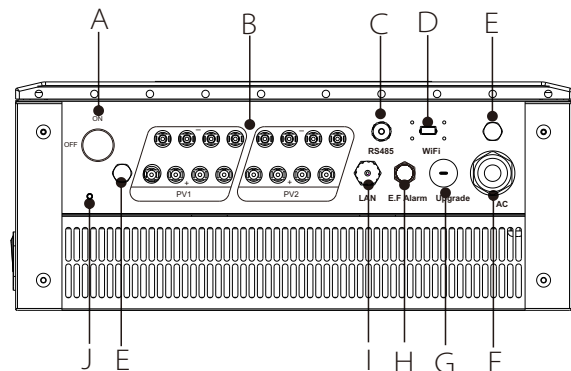


figure2

Object	Description
A	DC Switch(optional)
B	DC Connector area
C	Cables Opening for RS485 connection
D	Pocket WiFi (Optional)
E	Waterproof Lock Valve
F	AC Connector
G	USB for upgrade
H	Earth Fault Alarm(Optional)
I	LAN Connector
J	Ground screw

table3 Terminal of PV inverter

WARNING!
Only qualified electricians can operate the connection.

3.3 Dimensions

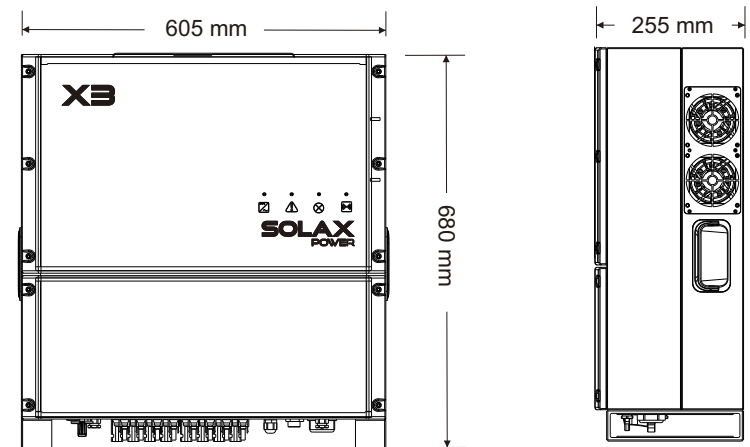


figure3

4 Technical Data

4.1 DC Input

Model	X3-30.0-T-D/ X3-30.0-T-N	X3-36.0-T-D/ X3-36.0-T-N
Max. DC input voltage(V)	1000	
Nominal input voltage(V)	640	750
Max. DC input current(A)	34/34	
DC input power(KW)	20/20	23/23
Max. short-circuit current(A)	48/48	
MPPT voltage range(V)	280-950	
MPPT voltage range @full load(V)	480	580
Output voltage of starting grid connection(V)	300	
No. of MPP inputs	2	
No. of strings per MPP input	4	
DC switch	Optional	

table4 DC input

4.2 AC Output

Model	X3-30.0-T-D/ X3-30.0-T-N	X3-36.0-T-D/ X3-36.0-T-N
Rated output power(W)	30000(29800 for AU)	36000
Max. apparent AC power(VA)	33000	40000
nominal voltage(V)	220/230	277
Nominal frequency(HZ)	50/60	
Frequency range(HZ)	45-55/55-65	
AC nominal current(A)	3*45	
Max. output current(A)	3*48	
Displacement power factor	0.8leading...0.8lagging	
THD	2%	
DC component	<0.5%	

table5 AC output

4.3 Efficiency, Safety and Protection

Model	X3-30.0-T-D/ X3-30.0-T-N	X3-36.0-T-D/ X3-36.0-T-N
Max. efficiency	98.60%	98.60%
Euro efficiency	98.30%	98.30%
MPPT efficiency	99.90%	99.90%
Safety & Protection		
Over/under voltage protection	YES	
DC isolation impedance protection	YES	
Ground fault protection	YES	
Grid monitoring	YES	
Grid fault current monitoring	YES	
DC injection monitoring	YES	
Back feed current monitoring	YES	
Residual current detection	YES	
Anti-island protection	YES	
Over load protection	YES	
Over heat protection	YES	

table6

4.4 General Data

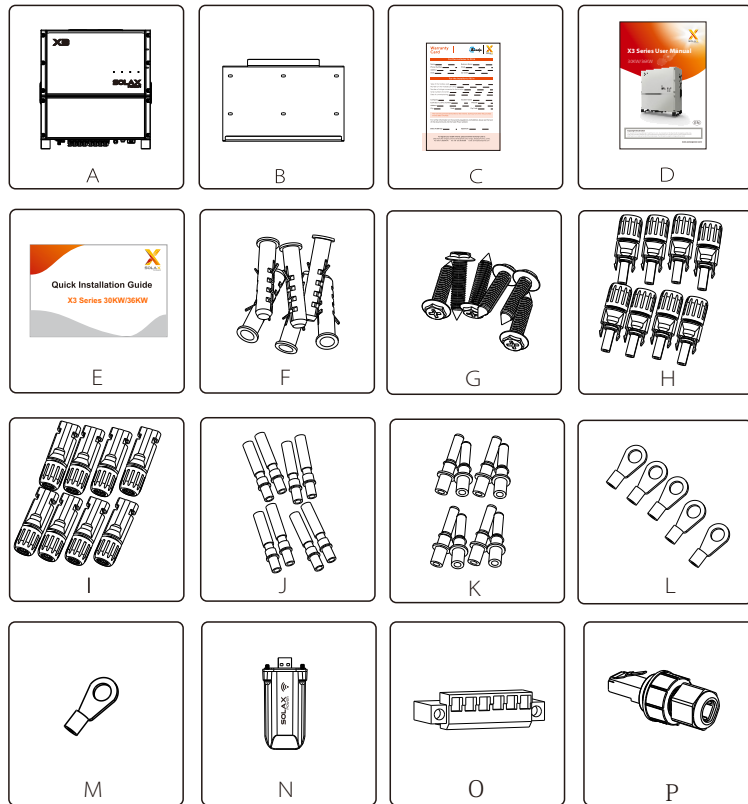
Model	X3-30.0-T-D/ X3-30.0-T-N	X3-36.0-T-D/ X3-36.0-T-N
Gross Weight(kg)	72	
Weight(kg)	64	
Dimension of packing (W/H/D)(mm)	740*862*397	
Dimension(W/H/D)(mm)	680*605*255	
Degree of protection	IP65	
Operating temperature range (°C)	-20...+60(derating at 45)	
Operating humidity range	0%..95%	
Altitude	<4000m	
Noise level	<50dB	
Fixed type	Wall-mounted	
Degree of protection	II	
Isolation type	No-isolation	
Night-time consumption	<1W	
Communication interface	RS485/Dry contact/Lan/Wi?Optional)	
Supported browser	Chrome/Safari	
Standard Warranty	5 years(10 years optional)	

table7

5 Installation

5.1 Unpacking

Check the delivery for completeness. Contact your dealer at once if anything is missing.



Object	Quantity	Description
A	1	X3 series inverter
B	1	Bracket
C	1	Warranty card
D	1	User manual
E	1	Quick installation guide
F	8	Expansion tubes
G	8	Expansion screws
H	8	Male DC connectors
I	8	Female DC connectors
J	8	Positive DC pin contact
K	8	Negative DC pin contact
L	5	AC terminal
M	1	Earth terminal
N	1	Pocket wifi(optional)
O	1	Dry contact terminal(Optional)
P	1	RS485 sealing connector

table8

Open the package and pick the product, check that if there is any distortion or impaired during the transportation. Meanwhile, check that if the relating accessories and the materials are here, you can see the accessories list in the table.

The instruction manual is an integral part of the unit and should therefore be read and kept carefully.

It is recommended that the packaging should not be removed until the unit is located in the installation site.

5.2 Check for transport damage

Check if the X3 Series inverter has some visible external damage, such as cracks in the housing or display, please contact with your dealer if you find any damage.

5.3 Installation precaution

The X3 series inverter is designed for outdoor installation(IP65). Make sure the installation site does not fall into none of the following conditions:

- Do not install the inverter in direct sunlight.
- Do not install the inverter on flammable construction material.
- Do not install the inverter in areas where highly flammable materials are stored.
- Do not install the inverter in potentially explosive areas.
- Do not install the inverter in the cool air directly.
- Do not install the inverter near the television antenna or antenna cable.
- Do not install the inverter in higher than the altitude of about 4,000m above sea level.
- Do not install the inverter during periods of precipitation of high humidity (>95%), moisture trapped within the location may cause corrosion and damage to the electric components.
- Install the inverter in a location that maintains an ambient air temperature which is less than 45°C, that is to maintain a safe internal component temperature, the inverter reduce power if the ambient air temperature exceeds 45°C
- The inverter should be installed in a location that is not accessible for children.
- The inverter emits a slight vibrating noise when operating, this noise is normal and no effect on performance.
- The slope of the wall should be within $\pm 5^\circ$
- Keep the inverter far away from the seawater.
- The inverter is heavy, ensure the mounting place is strong enough to hold the weight of the inverter .
- If you install the inverter in a cabinet, closet or other small enclosed area, sufficient air circulation must be provided in order to dissipate the heat generate by the unit.
- Please avoiding direct sunlight, rain exposure, snow lay up when installing.
- 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)

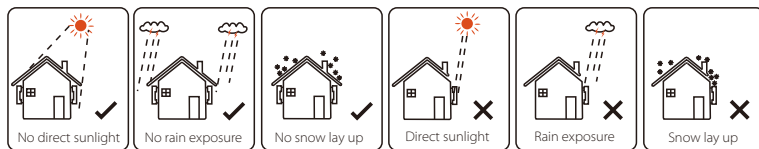


figure4

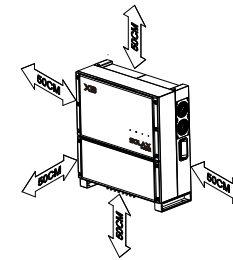


figure5

Available space size	
Position	Min.Size
Side	50cm
Top	50cm
Bottom	50cm
Front	50cm

5.4 Preparation

Below tools are needed before installation.



figure6

Installation Tools: crimping pliers for binding post and RJ45, screwdriver, manual wrench, $\Phi 8$ drill and rubber hammer.

Lifting and Handling

The unit is heavy. Do not lift it alone.

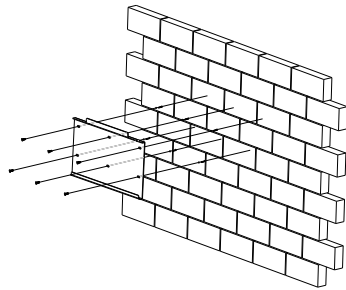
- During lifting procedures ensure that the unit is fully secured to avoid the risk of accidental tipping or dropping.
- Parts serving for support or immobilization of unit shall be designed and manufactured so as to minimize the risk of physical injuries and accidental loosening of fixing.
- Ensure that the method of lifting will not allow the unit to slip from chains and slings or turn-over or slide from lifting devices.
- Transportation must be carried by specialized person (truck operators, hook-up personal), equipped with the necessary protection equipments(overalls, safety shoes, protective gloves, helmets, goggles)
- Do not walk or stand beneath or in the proximity of the load.
- Avoid sudden movements and jolts when unloading and positioning the unit. Internal handling procedures must be conducted with care. Do not exert leverage on the components of the machine.
- If the unit is not balanced apply ballast. Any protruding parts should not be supported by hand.
- The inverter should be installed so that the operating panel shall be easily accessible easy access to the electrical power connection point.
- Accessible for maintenance and repair work.

- Loading capacity and hardness of the supporting surface, load rating of mounting bracket should be at least four times the weight of the devices according to IEC 62109-1 and supporting characteristic will be impaired by wear, corrosion, material fatigue or ageing. This should be calculated by inspection of the design data of supporting material and consulting construction engineer.

5.5 Installation steps

Step1: Screw the wall bracket on the wall

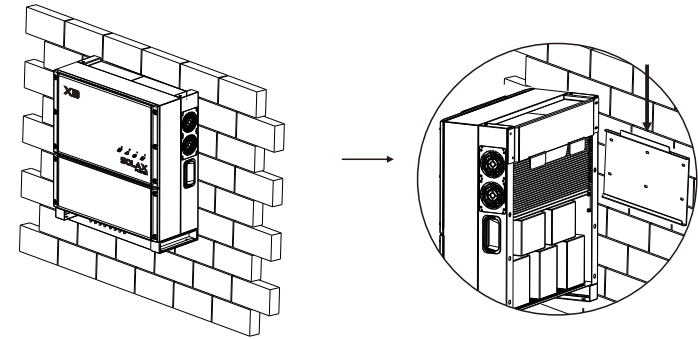
- Use the wall bracket as a template to mark the position of the six holes.
- Drill holes with $\phi 10$ driller carefully, make sure the holes are deep enough for install and tight the expansion tubes.
- Install the expansion tubes in the wall, and screw the wall bracket using the screws in the screw package.



Step1

Step2: Hang the X3 inverter onto the wall bracket.

- Transporting the inverter need at least 2 persons, each one needs to use the handles at the both sides of the inverter each.
- Hang the X3 inverter onto the bracket, make sure the support on the bracket is fixed well with the inverter.



Step2

5.6 Connections of the PV power system

● PV String



WARNING!

PV module voltage is very high which belongs to dangerous voltage range, please comply with electric safety rules when connecting.



WARNING!

When the photovoltaic array is exposed to light, it supplies a DC voltage to the PCE.



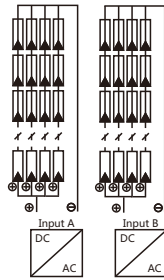
WARNING!

When there is something wrong with the modules arrays. Modules can be connected with inverter only after eliminating these problems.

The X3 Series inverters has two input areas "A" and "B", each with its own MPPT tracker, can be connected in series into 2-strings PV modules. Please select PV modules with excellent function and reliable quality. Open-circuit voltage of module arrays connected in series should be less than Max. DC input voltage; Operating voltage should be conformed to MPPT voltage range.

Model	X3-30.0-T-D/ X3-30.0-T-N	X3-36.0-T-D/ X3-36.0-T-N
Max. DC input voltage(V)	1000	
MPPT voltage range(V)	480~800	580~850

table9



The X3 with 2 MPP trackers area: A and B.
Area A with 4 strings input, area B with 4 string input.

figure7

NOTE!
The following requirements of PV modules need to be applied for each input are:

- Some type
- Some quantity
- Identical alignment
- Identical tilt

Please use PV cable to connect modules to inverter. From junction box to inverter voltage drop is about 1-2%. So we suggest the inverter install near PV module in order to save cable and reduce DC loss.(No longer than 30m)

NOTE!
Please do not make PV positive or negative ground!

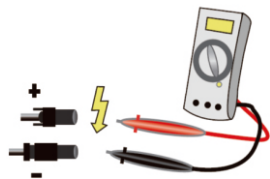


figure8

- Use multi-meter to measure module array voltage.
- Check the PV+ and PV- from the PV string combiner box correctly. Make sure the PV+ and PV- connected correctly.

Connection Steps

- Turn off the DC switch.
- Choose 12AWG wire to connect the PV module.
- Strip 6mm of insulation from the wire end.

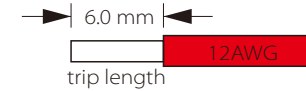


figure9

- Separate the DC connector as below.

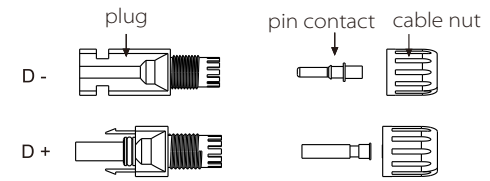


figure10

- Insert striped cable into pin contact and ensure all conductor strand are captured in the pin contact.
- Crimp pin contact by using a crimping pliers. Put the pin contact with striped cable into the corresponding crimping pliers and crimp the contact.



figure11

- Insert pin contact through the cable nut to assemble into back of the male or female plug. When you feel or heard a "click" the pin contact assembly is seated correctly.



figure12

- Tight the DC connector.
 - Slide the cable nut towards the back shell.
 - Rotate the cable nut to secure the cable

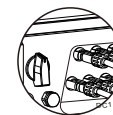




figure13

WARNING!
 Before connecting, disconnecting the connection between solar generator and inverter and locked it to the open position during installation. Place a warning sign "do not turn on maintenance in progress" on the external disconnect switch when it is shut down, and make sure that on-off remote controls are inhibited.

● AC Output

WARNING!
 Must comply with the connection requirement of your distribution grid.

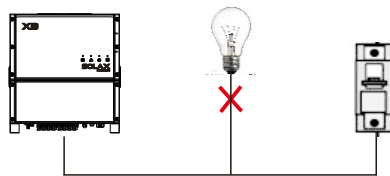
X3 Series inverters are designed for three phase grid. Voltage range is from 480V±10%, according to different countries. The typical frequency is 50HZ. Other technical requests should comply with the requirement of local public grid. For the terminal and cable design, please follow below requirement.

Cable and Micro-breaker recommended

Model	X3-30.0-T-D/ X3-30.0-T-N	X3-36.0-T-D/ X3-36.0-T-N
Cable(Cu) (mm ²)	≥16mm ²	
Micro-breaker(A)	50A	

table10

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



Incorrect Connection between Load and Inverter

figure14

Connection steps

1. Check the grid voltage and compare with the permissible voltage range (see technical data).
2. Disconnect the circuit-breaker from all the phases and secure against re-connection.
3. Strip the wires:
 - a. Strip all the wires to 52.5mm and the PE wire to 55mm.
 - b. Use the crimping pliers to strip 12mm of insulation from all wire ends as below.

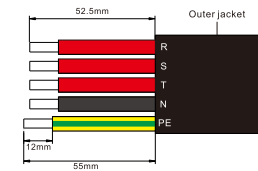


figure15

4. Separate AC cable gland, and insert the AC wire into the separate parts as following:

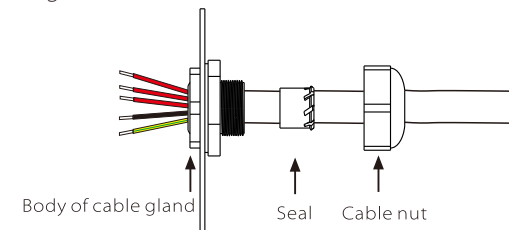


figure16

5. Insert striped cable into AC pin contact and insure all conductor strands are captured in the AC pin contact. Compress the AC pin contact's head by using a crimping pliers and compress tightly.

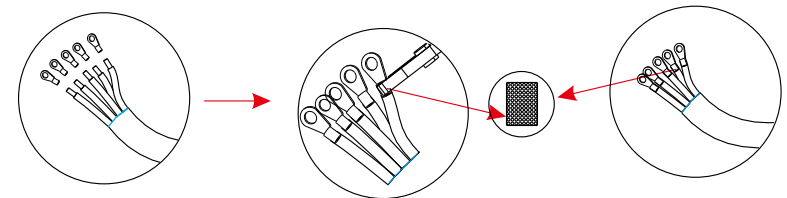


figure17

6. Insert the five wires into appropriate place in the AC terminal block (R-R, S-S, T-T, N-N, PE-PE).

7:Screw down the screws on the terminal block. Connect the terminal block.

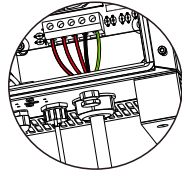


figure18

8:Tight the connection of the cable gland.

9:Install the cover of the inverter.

Selection of Fuses and Cables

Main cable(AC line cable)shall be short circuit protected and thermal overload protected.

Always fit the input cable with fuse. Normal gG(US:CC or T)fuses will protect the input cable in short circuit situation. They will also prevent damage to adjoining equipment.

Dimension the fuses according to local safety regulations, appropriate input voltage and the related current of the solar inverter.

AC output protected by external fuse(gG rated current 50A/600VAC)provide in all live connections to the AC supply.

The rated short circuit breaking capacity of the above protective device shall be at least equal to the prospective fault current at the point of installation. See section technical data of this manual details.

AC output cable: Cu;R, S, T, N+PE, 4*16.0mm²±6.0mm @40°C ambient temperature with a max length of 5m, with operating time of the fuses is less than 5 seconds, installation method B2 according to EN60204-1:2006, annex D: cable in conduit cable trunking system, number of loaded circuit only one. Use H07RNF(cord designation 60245 IEC66) for an ambient temperature of 40°C or less and use 90°C wire for ambient temperature between 40°C and 60°C.

Note 1: For condition differing from those mentioned above, dimension the cables according to local safety regulations, appropriate input voltage and the load and the load current of the unit.(You can choose a thicker cable but the fuses must rated according to the cable.)

Note 2:Fuses must be approved by Notified Body.

Inverter is not provided galvanic isolation from the mains to the PV array, feedback current to the array is 63A/250VAC based on the fuse provided in the mains. Also in the worst case the reverse current comprises the sum of the short-circuit currents of all intact lines.

The direct current(DC) circuit breaker or fuse between each solar generator and inverter shall be provided based on solar inverter input ratings. Select DC cables based in the above inverter and ISC PV rating and Vmax ratings.



NOTE!

If the AC cable you choose is 16mm² or larger, you need to break the connection between the two rubber rings which make up the rubber insert as below.



figure19

● Earth Connection

Screw the ground screw with allen wrench shown as follow.

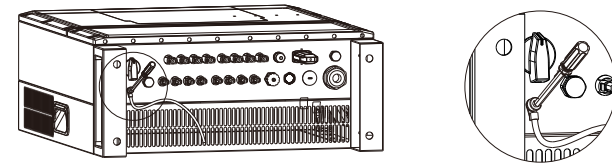


figure20

● Communication interface

This product has a series communication interfaces, besides WiFi port, Lan port, RS485&Dry contact and USB for upgrade are extend ports for human and machine communication. Operating information like output voltage, current, frequency, fault information etc, can be delivered to PC or other monitoring equipments via these interfaces.

① WiFi connection(optional)

This inverter provides a WiFi port which can collect information from inverter including status, performance and updating information to monitoring website via connecting Pocket WiFi(purchase the product from supplier if needed)

Connection steps:

- 1.Plug the Pocket WiFi into "WiFi" port at the bottom of inverter.
- 2.Connect the wifi with outer.
- 3.Set the station account on the solax web.(Please check the Pocket WiFi user manual for more detail)

② LAN Communication

LAN communication is one standard communication interface. It transmits the data between the router and X3 Series inverters in the local area network. User can set the parameters with specialized software provided by SolaX.

The pin definition of the connector is as below:

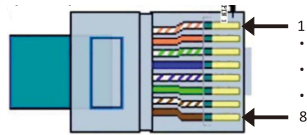


figure21

Pin	1	2	3	4	5	6	7	8
Function	TPTX+	TPTX-	3.3V	GND	GND	3.3V	TPRX+	TPRX-

table11

Connection steps

- 1.Prepare two RJ45 connectors and a communication cable.
- 2.Trip the insulation from the communication cable.
- 3.Insert the communication cable into the RJ45 connector following the PIN definition rule.
- 4.Crimp the RJ45 connector with the crimping plier.
- 5.Repeat the above steps to fix the other head of the communication cable.
- 6.Insert one side of the cable into the LAN port on the inverter, and the other side of the cable into the router or into the PC if you want to set the parameters.

③ RS485&Dry contact

a(1). X-NFI(Optional)

X-NFI is integrated with meter, it can control the output and reduce the power of inverter, to assure the redundant power will not feed into Grid, X-NFI communication use terminal block on the communication board in the inverter.

Please refer to the X-NFI user manual for details.

a(2). RS485 Communication

RS 485 is one standard communication interface which can transmit the real data from inverter to PC or other monitoring equipments. RS 485 communication shares the terminal block with X-NFI, and the definition is as below.

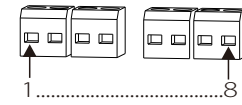


figure22

PIN	1	2	3	4	5	6	7	8
De?nition	485_B	485_A	485_B	485_A	NFL_B	NFL_A	NFL_B	NFL_A

table12

Connection steps

- 1:Open the cover on the inverter.

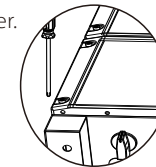


figure23

- 2:Separate the Rs485 cable gland.

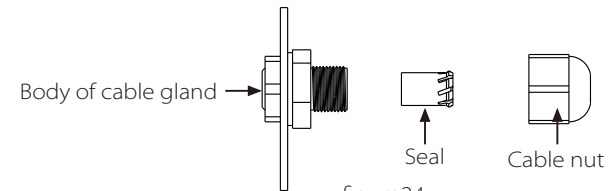


figure24

- 3: Trip the insulation from the wire ends.
- 4: Insert the wire into the separate parts as following:

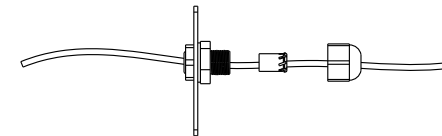


figure25

- 5:Screw down the screws on the terminal block. Connect the terminal block following the PIN definition rule.
- 6:Tight the connection of the cable gland.
 - a. Slide the seal to the body of the cable gland, insert the seal into the body of the cable gland.
 - b. Slide the cable nut to the body of the cable gland, rotate the cable nut to tight the connection.
- 7:Install the cover of the inverter.

b. Dry contact(Optional)

Dry contact is provided to give a remote monitor and remote control. The remote monitor function provides an indication on the inverter's working status. The remote control function provides a contact signal to operate the inverter. The dry contact communication use terminal block on the communication board in the inverter. The PIN definition is as below.

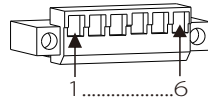


figure26

PIN	1	2	3	4	5	6
De?nition	DRM1	DRM2	DRM3	DRM4	3.3V	DRM0

table13

Connection steps

The connection steps are the same as the steps of RS485 connection steps.

④ Earth Fault Alarm(Optional)

The earth fault alarm is the additional detection, as required by AS 4777.2 and AS/NZS 5033, it will give an alarm once the earth impedance of the PV arrays is more than 33KΩ .

⑤ Upgrade

User can update the inverter system through an U-disk.

Warning! Make sure the input voltage is more than 200V (in good illumination condition), or it may result in failing during updating.

Upgrade Steps:

- 1) Please contact our service support to get the update file, and extract it into your U-disk as follow

```
"update\ARM\618.00083.00_X330K_ARM_Vx.xx_xxxxxxx.usb";
"update\DSP\618.00081.00_X330K_DSP_Vx.xx_xxxxxxx.hex".
```

Note: Vx.xx is version number, xxxxxxxx is file completion date .

Warning! Make sure the directory is in accordance with above form strictly! Do not modify the program file name ! Or it may cause the inverter doesn't work anymore !

- 2) Make sure the DC switch is off and the AC is disconnected with grid. Unscrew the waterproof lid, then insert U-disk into the "Upgrade" port on the bottom of the inverter. Then turn on DC switch or connect the PV connector.

- 3) ARM update(need several seconds)

The inverter will alternately flash blue and yellow(flicker) light about 15 times later, automatically check if the device is needed to be updated. If necessary, the light on the inverter will show the updated process, specific meaning of the light sees the table.

	blue	yellow	red	yellow (flicker)	update level
light state (bright/ and not bright×)	✓	×	×	×	25%
	✓	✓	×	×	50%
	✓	✓	✓	×	75%
	✓	✓	✓	✓	100%

table14

Pull off the U-disk,and the inverter will be restarted. Please contact your supplier if the ARM upgrading is failed.

- 4) DSP update(need several minutes)

After ARM update, if the USB disk is still on the inverter, the inverter will also alternately flash blue and yellow(flicker) light about 15 times later, automatically check whether the DSP needed be updated or not. The process is the same as the ARM update process.

*note: Please do not pull up the U-disk if the DSP upgrading is failed. The system will keep upgrading until it is successful.

- 5) After the upgrade is complete, please remember to turn off the DC switch or disconnect the PV connector, then pull off the U-disk, screw the waterproof lid.

Warning! During updating, please turn off the DC switch or disconnect the PV connector, then reinsert the U-disk.

5.7 Run the inverter


Start inverter after checking all below steps:

- a) Check that device is fixed well on the wall.
- b) Make sure all the DC breakers and AC breakers are disconnected.
- c) AC cable is connected to grid correctly.
- d) All PV panels are connected to inverter correctly, DC connectors which are not used should be sealed by cover.

Start inverter


- Turn on the external AC and DC connectors.
- Turn on the DC switch to the "ON" position.
- Inverter will start automatically when PV panels generate enough energy.
- Check the status of signal light, the LED should be green.
- If the green light is not on, please check the below:
 - All the connections are right.
 - All the external disconnect switches are closed.
 - The DC switch of the inverter is in the "ON" position.

WARNING!



Power to the unit must be turned on only after installation work has been completed. All electrical connections must be carried out by qualified personnel in accordance with legislation in force in the country concerned.

NOTE!



Above steps is for the regular start up of the inverter. Please set the inverter if it is the first time to start up.

6 Internet monitoring function

6.1 Connect and log on

1. Connect the computer to the inverter by a network cable.

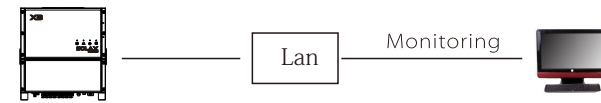


figure27

2. Please set static IP address: 192.168.1.** (range: 0~256), open the browser (Chrome/Safari), input IP address: 192.168.1.13 (Please input the dynamic IP address from the router if the inverter connects to a computer via a router.)

3. Choose user, type in the initial password: 123456.

6.2 Menu structure

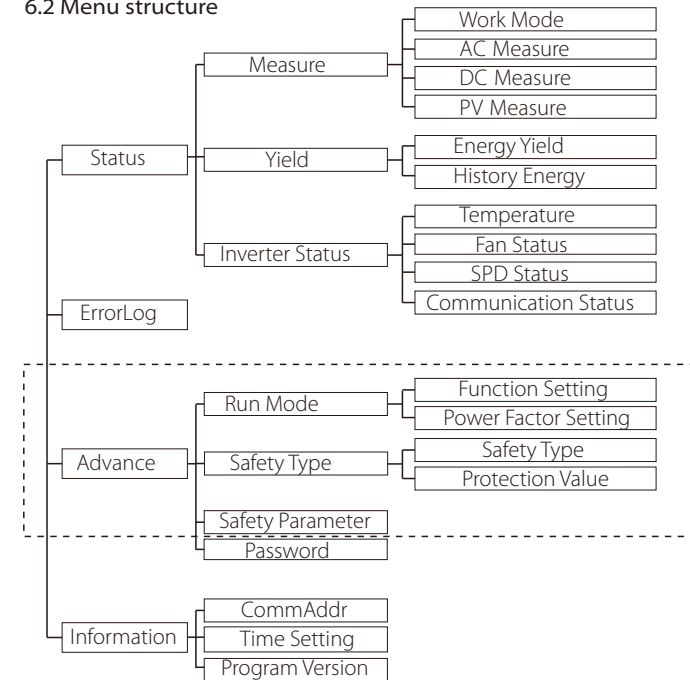


figure28 Menu structure

Note: The part in the dashed frame is only set by technician and the installer with the installer password.

6.3 Internet operation

- Status

- 1) Measure

It shows the information of Work Mode, AC input, DC input and PV status.

Work Mode	Current Working Mode Waiting.....					
AC Measure	VacR	0	V	IacR	0	A
	VacS	0	V	IacS	0	A
	VacT	0	V	IacT	0	A
	Pac	0	kW	Frequency	0	Hz
DC Measure	Vdc1	0	V	Vdc2	0	V
	Idc1	0	A	Idc2	0	A
	Pdc1	0	kW	Pdc2	0	kW
PV Measure	I(PV1-1)	0	A	I(PV2-1)	0	A
	I(PV1-2)	0	A	I(PV2-2)	0	A
	I(PV1-3)	0	A	I(PV2-3)	0	A
	I(PV1-4)	0	A	I(PV2-4)	0	A

figure29

- 2) Yield

Yield displays the generated power with histogram

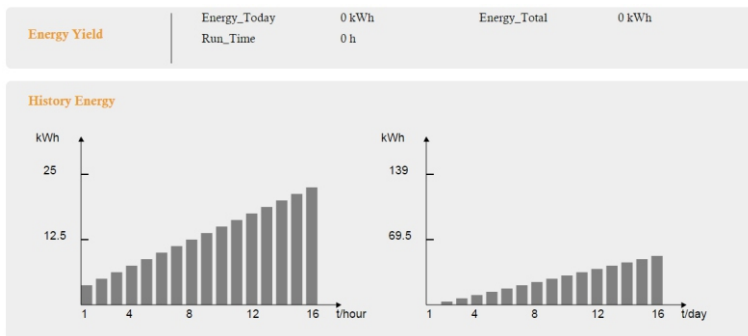


figure30

- 3) Inverter Status

It includes information of the inverter: temperature, Fan Status, SPD Status and Communication Status.

Temperature	Inner	0 °C	Radiator	0 °C
	Inverter	0 °C	IGBT-R	0 °C
	IGBT-S	0 °C	IGBT-T	0 °C
Fan Status	Fan1 :	OK	Fan2 :	OK
			Fan3 :	OK
SPD Status	SPD1 :	OK	SPD2 :	OK
			SPD3 :	OK
Communication Status	RS485 :	OK	WIFI :	OK

figure31

- Errorlog

It displays the error information happened with the inverter.

- Advance

- 1) Run Mode

Only can installer or technician set the parameters.

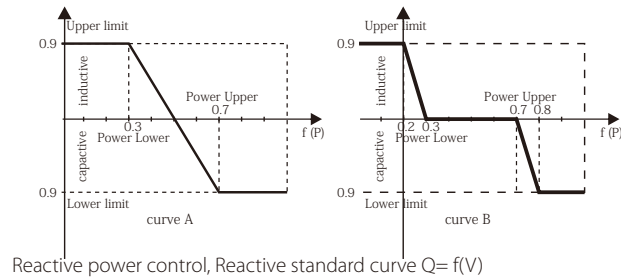
Function Setting	ConnectionMode	CommonMode ▾		
	ARC_Detection	DISABLE ▾		
	ShadowMPPT	DISABLE ▾		
	LVRT	DISABLE ▾		
SubConfig				
Power Factor Setting	Power Factor Type	OFF ▾	Power Factor	0
	Lower Limit	0	Upper Limit	0
	Lower Power	0	UpperPower	0
	wFixedQPower(Var)	0		
		(-25k - +25k)		
SubConfig				

figure32

Reactive power control, Reactive standard curve $\cos \phi = f(P)$

For VDE ARN 4105, curve $\cos \phi = f(P)$ should refer to curve A. default values of setting are as shown in curve A.

For E 8001, curve $\cos \phi = f(P)$ should refer to curve B. default values of setting are as shown in curve B.



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

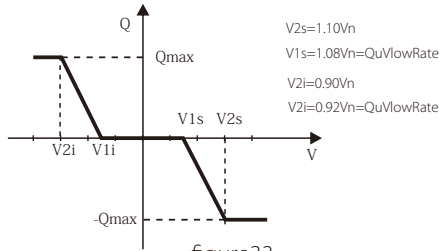


figure33

2) Safety Type

Safety standard can be set the here. According to different countries and grid tied standards. Please according to the requirement of local grid to set the parameters of the protection value.



figure34

Parameter	Setting	Min~Max	Description
Vpv_Start(V)	*** X0.1	150V~800V	PV start up voltage
T_Start(S)	*** X1	15Sec~300Sec	Time to connect grid
Vac_Min(V)	*** X0.1	180V~300V	Minimum operational grid voltage(stage2)
Vac_Max(V)	*** X0.1	180V~300V	Maximum operational grid voltage(stage2)
Vac Min Slow(V)	*** X0.1	180V~300V	Minimum operational grid voltage stage1(Slow)
Vac Max Slow(V)	*** X0.1	180V~300V	Maximum operational grid voltage stage1(Slow)

Parameter	Setting	Min~Max	Description
Fac_Min(Hz)	*** X0.01	45Hz~50Hz	Minimum operational grid frequency(stage2)
Fac_Max(Hz)	*** X0.01	50Hz~55Hz	Maximum operational grid frequency(stage2)
Fac_Min_Slow(Hz)	*** X0.01	45Hz~50Hz	Minimum operational grid frequency stage1(Slow)
Fac_Max_Slow(Hz)	*** X0.01	50Hz~55Hz	Maximum operational grid frequency stage1(Slow)
DCI_Limit(mA)	*** X1	20mA~2000mA	Maximum limit of DC injection current

table15 Parameter description

3) Safety Parameter

This is only for Australia, installer or technician can set those parameters.



figure35

4) Password

The user can set new password here.



figure36

• Information

The user can set the comm address and time, check the information of the program version.

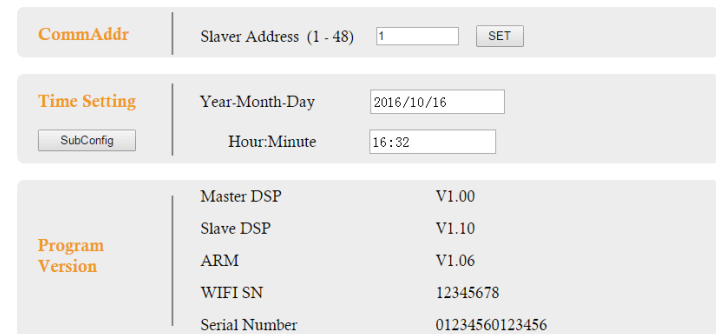


figure37

7 Troubleshooting

7.1 Trouble Shooting

This section contains information and procedures for solving problems with the X3 series inverters, and provides you with trouble shooting tips to identify and solve most problems that could occur with the X3 series inverters.

This section will help you narrow down the source of any problem you may encounter. Please read the following troubleshooting steps.

- Check the light of the inverter or the Fault Codes on the monitoring website. Please record it before doing anything further if a message is displayed.
- Attempt the solution indicated in below table.

When red light is on, the faults will be probability as below:

Faults	Diagnosis and Solution
HW_OCP_ACR	AC over current detected by hardware. • Disconnect PV+ and PV-, reconnect them. • Or seek help from us, if can not go back to normal state.
HW_OCP_ACS	
HW_OCP_ACT	
HW_OVP_BUS	BUS over voltage detected by hardware. • Disconnect PV+ and PV-, reconnect them. • Or seek help from us, if can not go back to normal state.
HW_OCP_Boost I	Boost over current detected by hardware. • Disconnect PV+ and PV-, reconnect them. • Or seek help from us, if can not go back to normal state.
HW_OCP_Boost II	
PV ConfigSet_Wrong	PV connection fault. • Disconnect PV+ and PV-, reconnect them. • Or seek help from us, if can not go back to normal state.
SampleConsistentFault	The detection circuit fault. • Disconnect PV+ and PV-, reconnect them. • Or seek help from us, if can not go back to normal state.
UnRecover_Relay Fault	Relay fault. • Disconnect PV+ and PV-, reconnect them. • Or seek help from us, if can not go back to normal state.

table16 Diagnosis and solution of faults-1

Faults	Diagnosis and solution
Current_Sensor_Fault	Current sensor fault. • Disconnect PV+ and PV-, reconnect them. • Or seek help from us, if can not go back to normal state.
EEPROM_WR_Fault	EEPROM reading or writing fault. • Disconnect PV+ and PV-, reconnect them. • Or seek help from us, if can not go back to normal state.
GFCI_Device_Fault	Leakage current detection device Fault. • Disconnect PV+ and PV-, reconnect them. • Or seek help from us, if can not go back to normal state.
SW_OCP_ACR	AC over current detection by software. • The grid current is not stable. • Wait for a while, the system will reconnect to the grid automatically.
SW_OCP_ACS	
SW_OCP_ACT	
SW_OCP_Boost I	Boost over current detection by software. • The PV input is not stable. • Wait for a while, the system will reconnect to the grid automatically.
SW_OCP_Boost II	
PLL Fault	Phase-lock over time. • Wait for a while, the system will reconnect to the grid automatically. • If this fault happens frequently, please check the three phase connection. • Or, seek help from us.
Grid_Lost_Fault	Grid voltage or frequency is out of range or not present at all. • System will reconnect after the utility is back to normal. • Or seek help from us,
SW_OVP_AC	Over voltage in AC side. • Wait for a while, the system will reconnect to the grid automatically. • Or seek help from us,
SW_OVP_Boost I	Boost over voltage detected by software. • Check the PV input, make sure the MaxDC voltage is < 950V. • Or seek help from us.
SW_OVP_Boost II	
SW_OVP_ACR	Over current/voltage of each phase in AC side detected by software. • If one of the fault happens frequently, please contact with the dealer to check the nearest transformer. • Or seek help from us.
SW_OVP_ACS	
SW_OVP_ACT	
SW_UVP_ACR	
SW_UVP_ACS	
SW_UVP_ACT	

table16 Diagnosis and solution of faults-2

Faults	Diagnosis and solution
SW_OFF_AC	The grid frequency is out of limit. <ul style="list-style-type: none"> • If this happens frequently, please contact with the grid Corp, get the password to set the value.(VDE4105) • Or seek help from us.
SW_UFP_AC	
SW_UFP_ACR	
SW_UFP_ACS	
SW_UFP_ACT	
SW_OFF_ACR	
SW_OFF_ACS	
SW_OFF_ACT	
ISO I Fault	Isolation fault in boost circuit. <ul style="list-style-type: none"> • Please check the PV input wire. • Or seek help from us,
ISO II Fault	
RelayShortFault	The relay in the inverter is fault. <ul style="list-style-type: none"> • Please contact with us.
RelayOpenFault	
SW_OCP_DCI	DCI current over limit. <ul style="list-style-type: none"> • Please contact with us.
SW_OCP_RCD_Jump I	Residual current detector device fault or residual current over limit, <ul style="list-style-type: none"> • Check the impedance of DC input and AC output. • Or seek help from us.
SW_OCP_RCD_Jump II	
SW_OCP_RCD_Jump III	
SW_OCP_RCD_300mA	
SW_OverTemp	Temperature is over limit. <ul style="list-style-type: none"> • Check if fan is running normally. • Check if the environment temperature is over limit. • Or seek help from us.
SW_IACRMS_Unbalance	The RMS value of AC current not balance.
Control Loop ERR	Controller fault. <ul style="list-style-type: none"> • Contact with us if this happens frequently.
PhaseDelta Fault	Phase fault. <ul style="list-style-type: none"> • Contact with us if this happens frequently.

table16 Diagnosis and solution of faults-3

When yellow light is on, the faults will be probability as below:

Faults	Diagnosis and solution
UnRecover_FANXFault	Fan circuit fault. <ul style="list-style-type: none"> • Disconnect PV+ and PV- , reconnect them. • Or seek help from us, if can not go back to normal state.
SW_FAN I fault	Fan fault. <ul style="list-style-type: none"> • Check if fan is running normally. • Check if anything block the fan. • Or seek help from us.
SW_FAN II fault	
SW_FAN III fault	
SPD Fault	Surge protection devices fault. <ul style="list-style-type: none"> • Contact with us if this happens frequently.


table16 Diagnosis and solution of faults-4

- If your inverter 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?
 - Have the DC input breakers been opened?
 - 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 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.

7.2 Routine Maintenance

Inverters do not need any maintenance or correction in most condition, but the cooling fans on the rear of house are covered by dirt if the inverter often loses power due to overheating. Please clean the cooling fins with a soft dry cloth or brush if necessary.



WARNING!
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 by manufacturer's qualified person who has adequate training, knowledge, and practical experience to perform these tests. The data should be recorded in an equipment log. If the device is not functioning properly or fails any of test, the device has to be repaired. For safety check details, refer to this manual, section 2 Safety instruction and EC Directives.

► Maintain periodically

Only qualified person may perform the following works. During the process of using the inverter, the manage person shall examine and maintain the machine regularly. The concrete operations are follow.

1: Check that if the cooling fins on the ear of house are covered by dirts, and the machine should be cleaned and absorbed dust when necessary. This work shall be check time to time.

2: Check that if the indicators of the inverter are in normal state, check if the keys of the inverter are in normal state, check if the display of the inverter is normal. This check should be performed at least every 6 months.

3: Check that if the input and output wires are damaged or aged. This check should be performed at least every 6 months.

4: You should get the inverter panels cleaned and their security checked at least every 6 months.

► Clean the ventilation grids

The inverter takes cooling air in form of the fan, it will directly result in bad flow of air to the inverter if the ventilation grid is covered with dust. Clean the ventilation grids by authorized professional personnel if they are dirty.



NOTE!

The ventilation grids which takes the responsibility to protect the inverter against the entrance of insects can not be removed for long time.

8. Decommissioning

8.1 Dismantling the Inverter

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

8.2 Packaging

- If possible, please pack the inverter with the original packaging. If it is no longer available, you can also use an equivalent carton that meets the following requirements.
- Suitable for loads more than 30 kg.
 - With handle.
 - Can be fully closed.

8.3 Storage

Store the inverter in dry place where ambient temperatures are always between -20 °C - +60 °C. Take care of the inverter during the storage and transportation, keep less than 4 cartons in one stack.

8.4 Disposal

When the inverter or other related components need to be disposed. Have it carried out according to local waste handling regulations. Please be sure to deliver wasted inverters and packing materials to certain site, where can assist relevant department to dispose and recycle.