



X1-Hybrid User Manual

3.0kw - 5.0kw



EN



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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 EC Directives | 09 |
| 3 Introduction | 10 |
| 3.1 Basic Features | 10 |
| 3.2 Work Status | 12 |
| 3.3 Dimension | 13 |
| 3.4 Terminals of Inverter | 14 |
| 4 Technical Data | 15 |
| 4.1 DC input (apply to version E, I, C) | 15 |
| 4.2 AC output/input (apply to version E, I, C) | 15 |
| 4.3 Internal Charger (apply to version E, I, C) | 16 |
| 4.4 Efficiency, Safety and Protection (apply to version E, I, C) | 16 |
| 4.5 EPS output (apply to version E, I) | 17 |
| 4.6 General Data (apply to version E, I, C) | 17 |
| 5 Installation | 18 |
| 5.1 Check for Transport Damage | 18 |
| 5.2 Packing List | 18 |
| 5.3 Mounting | 19 |
| 6 Electrical Connection | 22 |
| 6.1 PV Connection | 22 |
| 6.2 Grid Connection | 23 |
| 6.3 EPS Connection(apply to I Version and E Version) | 26 |
| 6.4 Battery Connection | 30 |

| | |
|---|----|
| 6.5 Earth Connection | 35 |
| 6.6 Meter/CT Connection | 36 |
| 6.7 LAN Connection | 41 |
| 6.8 DRM Connection | 44 |
| 6.9 WiFi Connection(optional)..... | 46 |
| 6.10 Other Communication Connection | 46 |
| 6.11 Commissioning Inverter | 47 |

7 Firmware Upgrading 49

8 Setting 51

| | |
|--------------------------|----|
| 8.1 Control Panel | 51 |
| 8.2 Menu Structure | 52 |
| 8.3 LCD Operation | 53 |

9 Troubleshooting 72

| | |
|-------------------------------|----|
| 9.1 Trouble Shooting | 72 |
| 9.2 Routine Maintenance | 76 |

10 Decommissioning 77

| | |
|---------------------------------------|----|
| 10.1 Dismantling the Inverter | 77 |
| 10.2 Packaging | 77 |
| 10.3 Storage and Transportation | 77 |

1 Notes on this Manual

1.1 Scope of Validity

This manual is an integral part of X1-Hybrid, It describes the assembly, installation, commissioning, maintenance and failure of the product. Please read it carefully before operating.

| | | | |
|-------------------|-------------------|-------------------|-------------------|
| X1-Hybrid-3.0-N-E | X1-Hybrid-3.7-N-E | X1-Hybrid-4.6-N-E | X1-Hybrid-5.0-N-E |
| X1-Hybrid-3.0-D-E | X1-Hybrid-3.7-D-E | X1-Hybrid-4.6-D-E | X1-Hybrid-5.0-D-E |
| X1-Hybrid-3.0-N-I | X1-Hybrid-3.7-N-I | X1-Hybrid-4.6-N-I | X1-Hybrid-5.0-N-I |
| X1-Hybrid-3.0-D-I | X1-Hybrid-3.7-D-I | X1-Hybrid-4.6-D-I | X1-Hybrid-5.0-D-I |
| X1-Hybrid-3.0-N-C | X1-Hybrid-3.7-N-C | X1-Hybrid-4.6-N-C | X1-Hybrid-5.0-N-C |
| X1-Hybrid-3.0-D-C | X1-Hybrid-3.7-D-C | X1-Hybrid-4.6-D-C | X1-Hybrid-5.0-D-C |

Note: **"3.0"** means 3.0kW.

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

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

"I" means "EPS function" available as unit already content an internal changeover device.

"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. The grid connected inverter is fitted with 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. X1-Hybrid seires inverter provide Active Frequency Drift(AFD) to prevent islanding effect.

► PE Connection and Leakage Current

• All inverter 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.

The device is intended to connect to a PV generator with a capacitance limit of approx 700nf.



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.

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 X1-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 communication is active. |
|  | 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, 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 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 (NEPA) No.70 or VDE regulation 0107.

3. Introduction

3.1 Basic features

X1-Hybrid Seires is a high-quality inverter which can convert solar energy to AC energy and store energy into battery.

The inverter can be used to optimize self consumption, store in the battery for future use or 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).

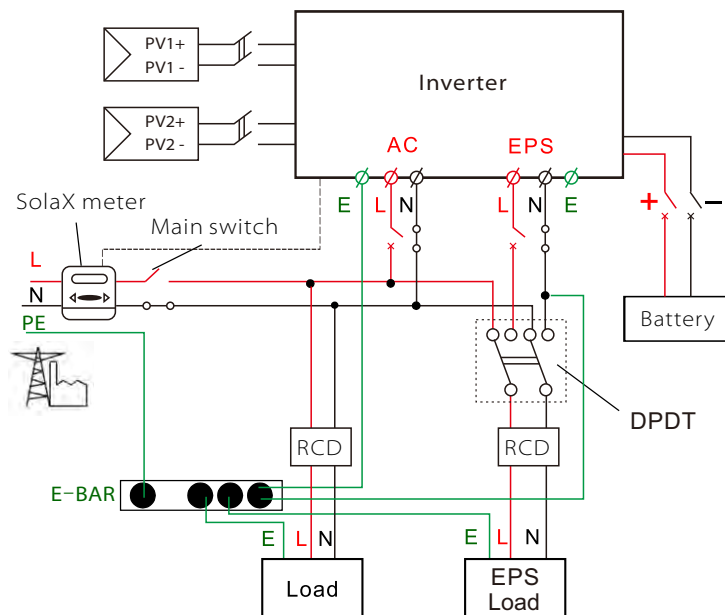
► System Diagram

X1-Hybrid Series is designed with two EPS versions for customer to choose based on the local rules.

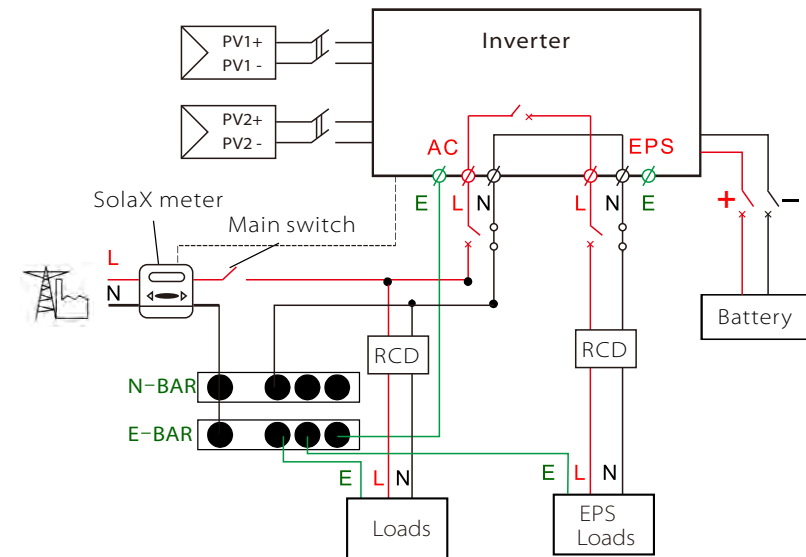
Note!

- 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.

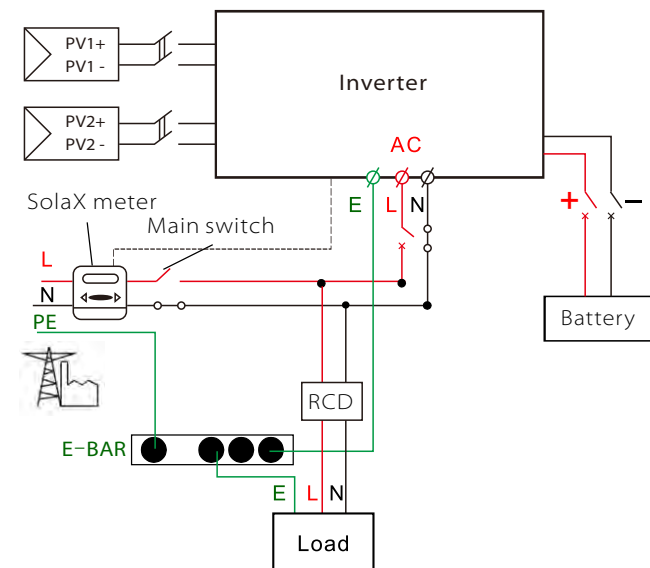
E Version applies to the wiring rules that requires the Live line and Neutral line of EPS must be disconnected with the Live line and Neutral line of grid. (applies to most countries)



I Version applies to the wiring rules that 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).

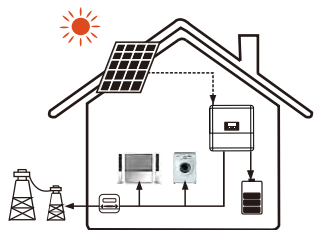


C Version Applicable to all countries



3.2 Work Modes

X1-Hybrid Series inverter provides multiple work modes based on different requirements.

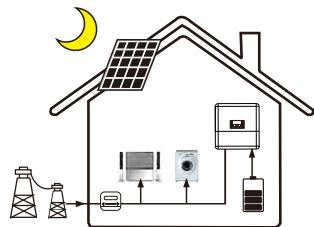


Work modes: **Self-use** (with PV Power)

Priority: load>battery>grid

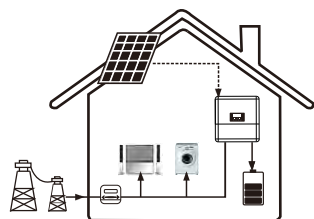
This mode applies the area that has low feed-in tariff and high energy price.

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



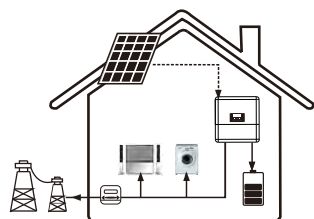
Work modes: **Force time use**

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 and discharging 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.

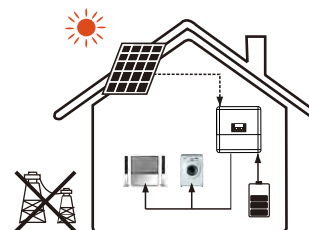
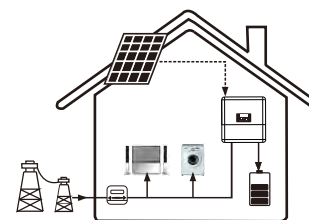
The PV generated power will be used to supply the local loads firstly, then export to the public grid. The redundant power will charge the battery.

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 have enough energy to supply when the grid is off.

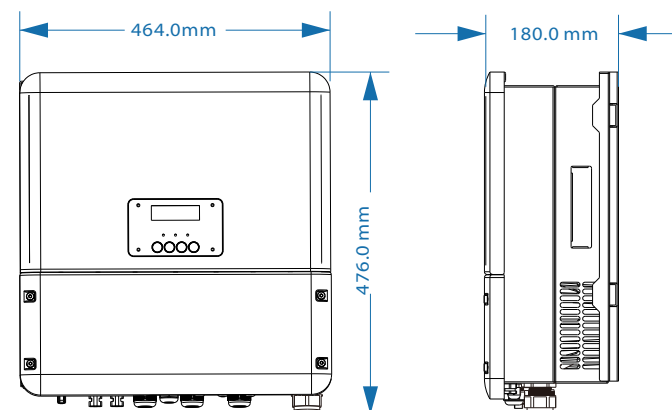
In this mode battery will be charging forcibly in the setting time and will never be discharged when the grid is on, and it also allows to choose whether charge from the grid or not.



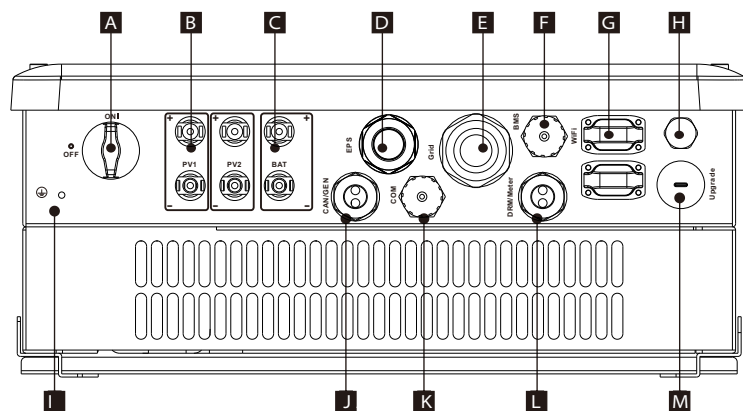
*** EPS Status**

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 | EPS output |
| E | Grid output |
| F | Battery communication |
| G | WiFi port for external Pocket WiFi |
| H | Waterproof valve |
| I | Earthing screw |
| J | CAN communication port for parallel operation/ Generator communication port (Both functions are being developed.) |
| K | Ethernet port |
| L | DRM port / External meter port |
| M | USB port for upgrading |



WARNING !

Qualified electrician will be required for the installation.

4. Technical Data

4.1 DC input (apply to version E, I, C)

| Model | X1-Hybrid-3.0-D X1-Hybrid-3.0-N | X1-Hybrid-3.7-D X1-Hybrid-3.7-N | X1-Hybrid-4.6-D X1-Hybrid-4.6-N | X1-Hybrid-5.0-D X1-Hybrid-5.0-N |
|----------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| Max. recommended DC power [W] | 4000 | 5000 | 6000 | 6000 |
| Max. DC voltage[V] | 600 | 600 | 600 | 600 |
| Normal DC operating voltage[V] | 360 | 360 | 360 | 360 |
| MPPT voltage range [V] | 125-550 | 125-550 | 125-550 | 125-550 |
| MPPT voltage range@full load [V] | 133-500 | 162-500 | 200-500 | 217-500 |
| Max. input current [A] | 12/12 | 12/12 | 12/12 | 12/12 |
| Max. short circuit current [A] | 14/14 | 14/14 | 14/14 | 14/14 |
| Start input voltage [V] | 85 | 85 | 85 | 85 |
| Start output voltage [V] | 150 | 150 | 150 | 150 |
| No. of MPP trackers | 2 | 2 | 2 | 2 |
| Strings per MPP tracker | 1 | 1 | 1 | 1 |
| Backfeed current to PV array | 0 | 0 | 0 | 0 |
| DC disconnection switch | optional | | | |

4.2 AC output/input (apply to version E, I, C)

| Model | X1-Hybrid-3.0-D X1-Hybrid-3.0-N | X1-Hybrid-3.7-D X1-Hybrid-3.7-N | X1-Hybrid-4.6-D X1-Hybrid-4.6-N | X1-Hybrid-5.0-D X1-Hybrid-5.0-N |
|-----------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| AC output | | | | |
| Normal AC power[VA] | 3000 | 3680 | 4600 | 4999 |
| Max. apparent AC power[VA] | 3300 | 4048 | 5060 | 5499 |
| Rated grid voltage(range)[V] | 220/230/240 (180 to 270) | | | |
| Rated grid frequency[Hz] | 50/60 | | | |
| Normal AC current[A] | 13 | 16 | 20 | 21.7 |
| Max.AC current[A] | 14.3 | 17.6 | 22 | 23.9 |
| Displacement power factor | 0.8 leading...0.8 lagging | | | |
| Total harmonic distortion(THDi) | < 2% | | | |
| Load control | optional | | | |
| AC input | | | | |
| Normal AC power[VA](E&C Version) | 3000 | 3680 | 4600 | 4999 |
| Normal AC power[VA](I Version) | 3000+4000(bypass) | 3680+4000(bypass) | 4600+5000(bypass) | 4999+5000(bypass) |
| Rated grid voltage(range)[V] | 220/230/240 (180 to 270) | | | |
| Rated grid frequency[Hz] | 50/60 | | | |
| Normal AC current[A](E&C Version) | 13 | 16 | 20 | 21.7 |
| Max.AC current[A](E&C Version) | 14.4 | 16 | 21 | 21.7 |
| Normal AC current[A](I Version) | 13+17.4(bypass) | 16+17.4(bypass) | 20+17.4(bypass) | 21.7+17.4(bypass) |
| Max. AC current[A](I Version) | 14.4+21.7(bypass) | 16+21.7(bypass) | 21+26.0(bypass) | 21.7+26.0(bypass) |
| Displacement power factor | 0.8 leading...0.8 lagging | | | |
| AC inrush current | 35 | 35 | 35 | 35 |
| AC maximum output fault current | 80 | 80 | 80 | 80 |

4.3 Internal Charger (apply to version E, I, C)

| Model | X1-Hybrid-3.0-D X1-Hybrid-3.0-N | X1-Hybrid-3.7-D X1-Hybrid-3.7-N | X1-Hybrid-4.6-D X1-Hybrid-4.6-N | X1-Hybrid-5.0-D X1-Hybrid-5.0-N |
|-----------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| Battery type | Lithium battery | | | |
| Battery voltage range[V] | 85-400 | | | |
| Recommended battery voltage[V] | 300VDC | | | |
| Recommended battery capacity[KWh] | 4.8-16.8 | | | |
| Max. charge/discharge current[A] | 20A(adjustable) | | | |
| Peak charge/discharge current[A] | 30A, 30s | | | |
| Communication interfaces | CAN/RS485 | | | |
| Reverse connect protection | Yes | | | |

4.4 Efficiency, Safety and Protection (apply to version E, I, C)

| Model | X1-Hybrid-3.0-D X1-Hybrid-3.0-N | X1-Hybrid-3.7-D X1-Hybrid-3.7-N | X1-Hybrid-4.6-D X1-Hybrid-4.6-N | X1-Hybrid-5.0-D X1-Hybrid-5.0-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 efficiency (PV to BAT)(@full load) | 98.50% | 98.50% | 98.50% | 98.50% |
| Max. Battery discharge efficiency (BAT to AC)(@full load) | 97.00% | 97.00% | 97.00% | 97.00% |
| Safety & Protection | | | | |
| Over/under voltage protection | YES | | | |
| DC isolation protection | YES | | | |
| Monitoring ground fault protection | YES | | | |
| Grid protection | YES | | | |
| DC injection monitoring | YES | | | |
| Back feed current monitoring | YES | | | |
| Residual current detection | YES | | | |
| Anti-islanding protection | YES | | | |
| Over load protection | YES | | | |
| Over heat protection | YES | | | |

4.5 EPS output (apply to version E, I)

| Model | X1-Hybrid-3.0-D | X1-Hybrid-3.7-D | X1-Hybrid-4.6-D | X1-Hybrid-5.0-D |
|-------------------------------------|-----------------|-----------------|-----------------|-----------------|
| | X1-Hybrid-3.0-N | X1-Hybrid-3.7-N | X1-Hybrid-4.6-N | X1-Hybrid-5.0-N |
| EPS rated power[VA] | 4000 | 4000 | 5000 | 5000 |
| Max. EPS power[VA] | 5000 | 5000 | 6000 | 6000 |
| EPS rated voltage[v], Frequency[Hz] | 230VAC, 50/60 | | | |
| EPS rated current[A] | 17.4 | 17.4 | 21.7 | 21.7 |
| Max. EPS current[A] | 21.7 | 21.7 | 26.0 | 26.0 |
| EPS peak power[W] | 6000,10s | | 8000,10s | |
| Switch time[s] | <500ms | | | |
| Total harmonic distortion(THDv) | <2% | | | |

4.6 General Data (apply to version E, I, C)

| Model | X1-Hybrid-3.0-D X1-Hybrid-3.0-N | X1-Hybrid-3.7-D X1-Hybrid-3.7-N | X1-Hybrid-4.6-D X1-Hybrid-4.6-N | X1-Hybrid-5.0-D X1-Hybrid-5.0-N |
|-------------------------------------|--|------------------------------------|------------------------------------|------------------------------------|
| Dimension [W/H/D](mm) | 476*464*180 | | | |
| Dimension of packing [W/H/D](mm) | 600*540*350 | | | |
| Net weight [kg] | 24 | 24 | 24 | 24 |
| Gross weight [kg] | 27 | 27 | 27 | 27 |
| 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) | | | |
| Protective Class | I | | | |
| Standby consumption [W] | 14 for hot standby, 4 for cold standby | | | |
| Over Voltage Category | III (MAINS), II (PV,Battery) | | | |
| Pollution Degree | III | | | |
| cooling | Natural | | | |
| Noise level | <40dB | | | |
| Inverter Topology | non-isolated | | | |
| Communication interface | Ethernet, Meter, Wifi(optional), DRM, USB | | | |

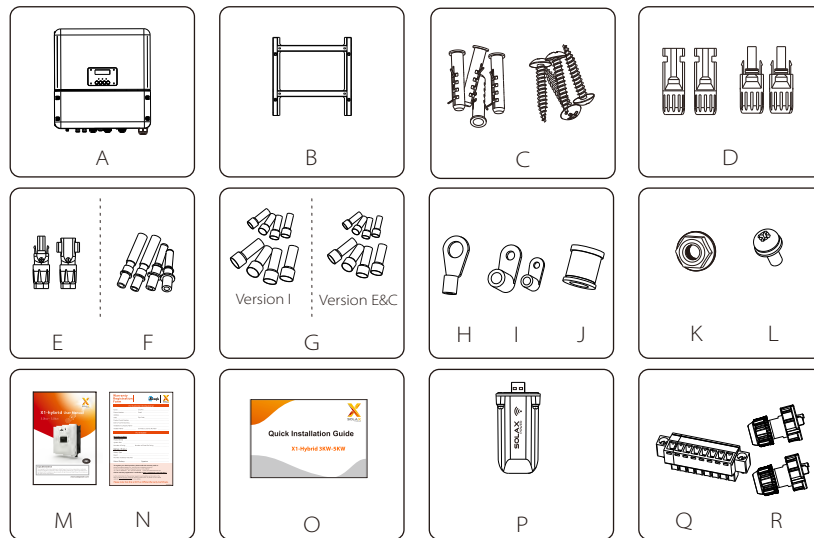
5. Installation

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 tube*4, Expansion screw*4 |
| D | PV connectors (2*positive, 2*negative) |
| E | Battery connectors (1*positive, 1*negative) |
| F | PV pin connectors (2*positive, 2*negative) |
| G | 4 6AWG AC terminals and 4 10AWG AC terminals for Version I 4 10AWG AC terminals and 4 8AWG AC terminals for Version E and Version C |

| Object | Description |
|--------|---|
| H | Ring terminal(for external enclosure grounding) |
| I | Ring terminal(*2 for internal enclosure grounding) |
| J | gasket(for using thin cable to connect on the AC port) |
| K | Grounding nut |
| L | Set screw(for mounting) |
| M | User manual |
| N | Warranty card |
| O | Quick installation guide |
| P | Wifi module (optional) |
| Q | 8 pin positive terminal |
| R | cable connector |

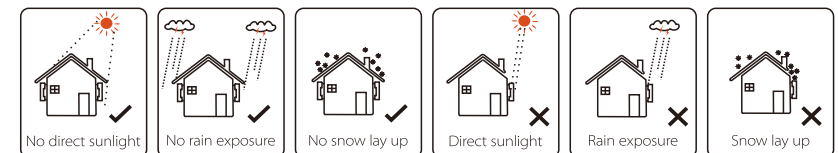
5.3 Mounting

➤ Installation Precaution

X1-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.
- Not in environment of precipitation or humidity (>95%).
- Under good ventilation condition.
- The ambient temperature in the range of -20°C to +60°C.
- 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 AVOID direct sunlight, rain exposure, snow laying up during installation and operation.



➤ Space Requirement

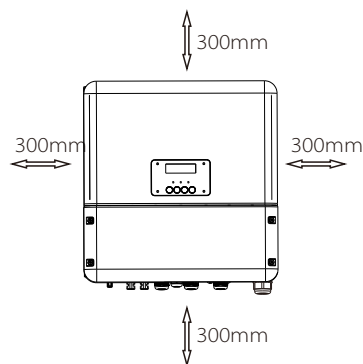


Table Available Space Size

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

➤ Mounting Steps

Tools required for installation.

Installation tools : wire crimper, stripping pliers, screwdriver, manual wrench and $\Phi 10$ drill.



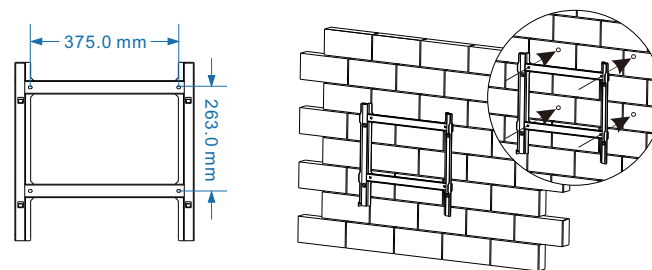
Step 1: Screw the wall bracket on the wall

- 1.1 Place the bracket on the wall and mark down the position of the 4 holes.
- 1.2 Drill holes with drill, make sure the holes are deep enough (at least 60mm) to support the inverter.
- 1.3 Install the expansion tubes in the holes, and tighten them. Then install the wall bracket with the expansion screws.

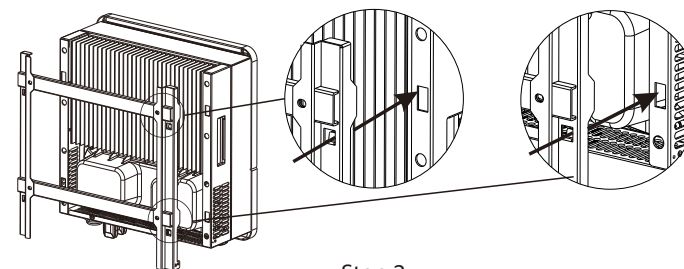
Step 2: Place the inverter on the wall mounted bracket by holding the handle on the side.

Step 3: Screw the set screw on the left-bottom of inverter tightly.

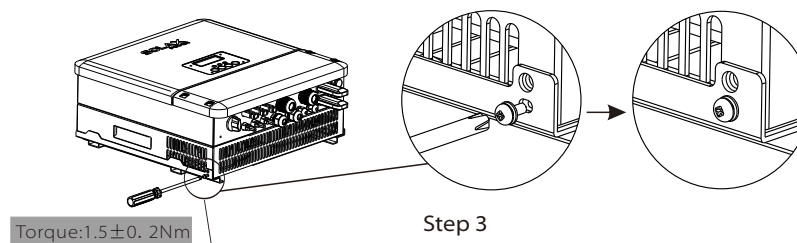
Step 4: If necessary, customer can install an anti-theft lock on the left-bottom of the inverter.



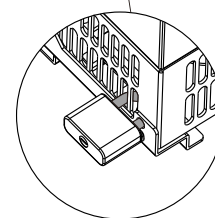
Step 1



Step 2



Step 3



Step 4

Overview of Mounting

