Quick Installation Guide _ for Parallel System

SolaX POWER

Part 1   Preparation

1.1   System Diagram

Cables marked with majuscule in below system diagram will be introduced in this manual.

A EPS connection between Inverter and X3-PBOX-150kW-G2.1 (refer to Part 2)

B Grid connection between Grid Distribution Box and X3-PBOX-150kW-G2.1(refer to Part 2)

C EPS Load connection between EPS load and X3-PBOX-150kW-G2.1 (refer to Part 2)

D Earth connection between X3-PBOX-150kW-G2.1 and external earth bar (refer to Part 2)

E Earth connection between X3-PBOX-150kW-G2.1 and EPS Load (refer to Part 2)

F Communication connection between X3-PBOX-150kW-G2.1 and Master Inverter (refer to Part 2)

G Communication connection between Inverters (refer to Part 3)

H Communication connection between Master Inverter and SolaX meter (refer to Part 3)
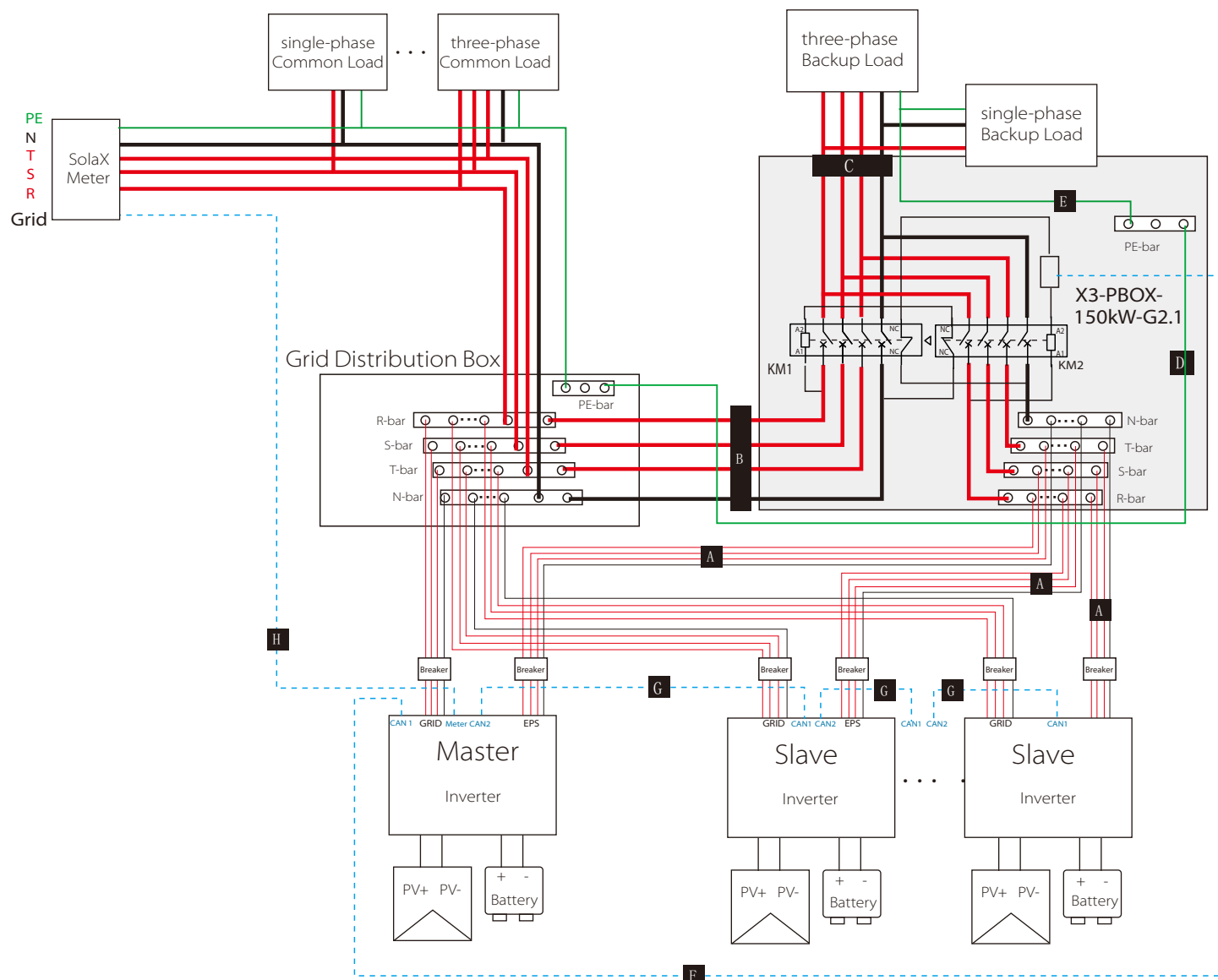
* When inverters have a parallel connection with X3-PBOX-150kW-G2.1, up to 10 X3-Hybrid G4 inverters or up to 5 X3-ULTRA inverters are allow to be connected

1.2   Packing List

- Expansion bolt * 4,
- Gasket(M8) * 4
- Cold-pressed terminal (35-10)*2 pcs, (70-10) *10
- Cold-pressed terminal (6-6) *45 for X3-Hybrid G4; (10-6) *45, (16-6) *45 for X3-ULTRA
- RJ 45 terminals * 1
- Communication terminal (green) * 1   (choose a suitable one when installing)
- Board marking paper *1
- Bracket * 1
- M4 inner hexagon bolt * 2
- Ground terminal (length, 450mm) * 1
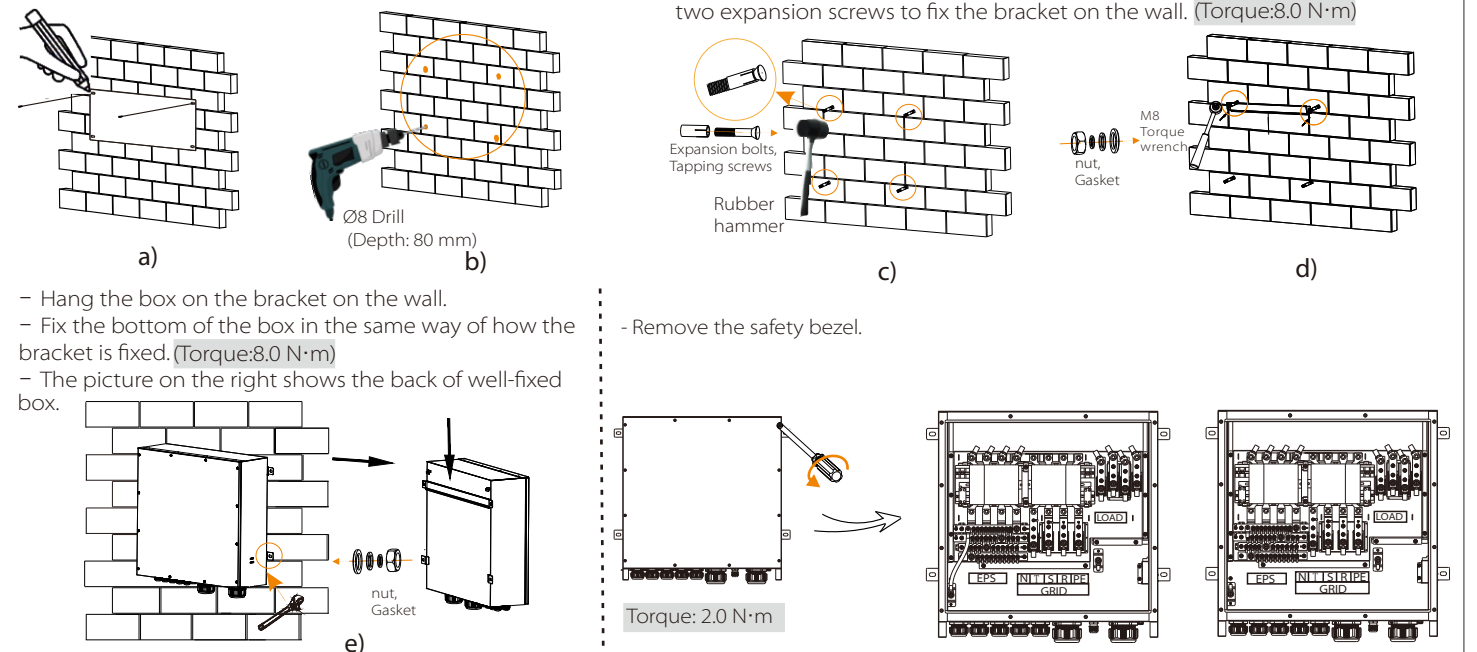- Warranty card * 1
- Quick Installation Guide * 1

1.3   Cable Preparation

- Press the terminal harness.

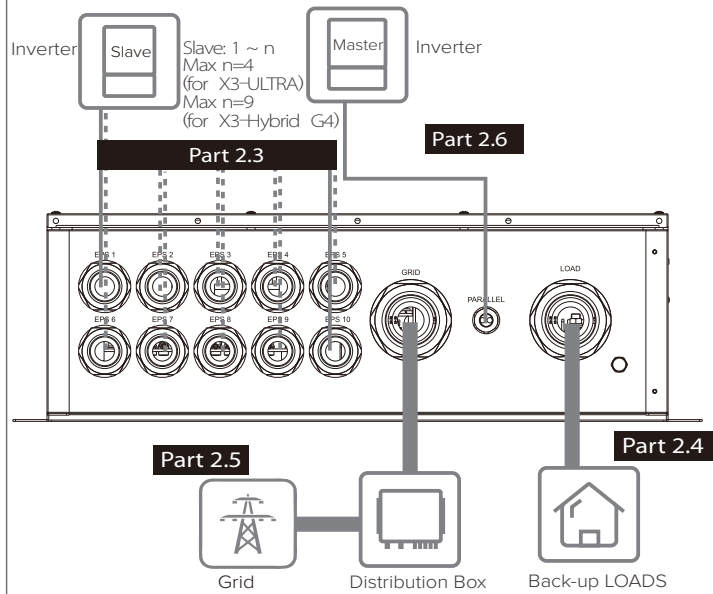| Connectors	Application	Connectors	Application	Connectors	Application	Connectors	Application
	R/S/T/N EPS connector × 10 pairs (for X3-Hybrid G4) R/S/T/N EPS connector × 5 pairs (for X3-ULTRA)		Grid R/S/T/N/PE Connector X 1 pcs Load&Grid R/S /T/N Connector X 1 pcs		RJ 45 terminals 1 pcs		Switching communication connection X1 pcs

1.4   Mounting

- Use the attachment bag of control cardboard drill four Ø8 holes.
- Depth: at least 80mm

- Tighten the four expansion tubes.
- Pass the expansion screws though the M6 washers, and then screw the top two expansion screws to fix the bracket on the wall. (Torque:8.0 N·m)

a)   Ø8 Drill (Depth: 80 mm)   b)   Expansion bolts, Tapping screws, Rubber hammer   c)   nut, Gasket, M8 Torque wrench   d)

- Hang the box on the bracket on the wall.
- Fix the bottom of the box in the same way of how the bracket is fixed.(Torque:8.0 N·m)
- The picture on the right shows the back of well-fixed box.

- Remove the safety bezel.

nut, Gasket   e)   Torque: 2.0 N·m

Note: Please refer to the turning radius of the prepared cables about the distance between the bottom of parallel box and the floor.

For Other Areas   For Australia

Part 2   Installation of X3-PBOX-150kW-G2.1

2.1   Connection Overview of X3-PBOX-150kW-G2.1

Inverter | Slave | Slave: 1 ~ n Max n=4 (for X3-ULTRA) Max n=9 (for X3-Hybrid G4) | Master | Inverter

Part 2.3   Part 2.6

Part 2.5   Part 2.4

Grid   Distribution Box   Back-up LOADS

X3-Hybrid G4 inverter connected with X3-PBOX-150kW-G2.1 is taken for an example in the left connection overview. When it is connected with X3-ULTRA inverter, the number of slave inverter and the EPS port connection is different.

Important Warning!

⚠ · Every cable must be connected according to correct line sequence (R-R, S-S, T-T, N-N), otherwise any small misoperation may cause the system running failed.

2.3   EPS Connection
2.4   Back-up Load Connection
2.5   GRID Connection
2.6   Communication Connection

2.2   Cable Size Recommended

Note: Soft cables are suggested for ease of installation.
Cable preparation when connected with X3-Hybrid G4 inverter

EPS	R-cable, S-cable, T-cable, N-cable	4-6mm² * 4 PCS for one EPS port
	Outer Diameter of EPS Cable	12. 5 -18 mm
	4 cables needed for one EPS port(one inverter) 8 cables needed for two EPS ports (two inverters paralleled) 40 cables needed for ten EPS ports maximummly (Ten inverters paralleled)	
Back-up Load	R-cable, S-cable, T-cable, N-cable	70mm² * 4 PCS
	Outer Diameter of LOAD Cable	18-44 mm.
Grid	R-cable, S-cable, T-cable, N-cable	70mm² * 4 PCS
	PE-cable	35mm² * 1 PCS
	Outer Diameter of GRID Cable	23-56mm
	Note: N bar connection in Australia is different from N bar connection in most countries.	
Communication	Communication cable	≥0.2mm² * 2 PCS for one communiction port
	Outer Diameter of Communication Cable	6-8 mm

Cable preparation when connected with X3-ULTRA inverter

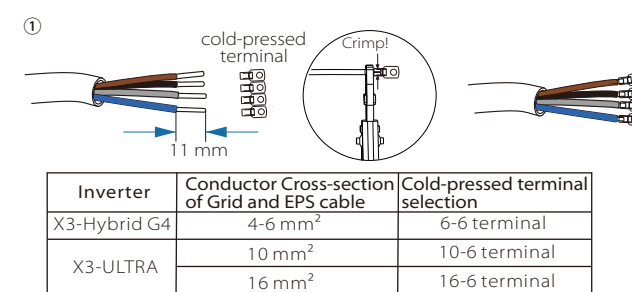|		
EPS	R-cable, S-cable, T-cable, N-cable	10 mm²/ 16 mm² * 4 PCS for one EPS port
	PE-cable	10 mm²/ 16 mm² * 1 PCS
	Outer Diameter of EPS Cable	20.5 -37 mm
	4 cables needed for one EPS port(one inverter) 8 cables needed for two EPS ports (two inverters paralleled) 20 cables needed for five EPS ports maximummly (Five inverters paralleled)	
Back-up Load	R-cable, S-cable, T-cable, N-cable	70mm² * 4 PCS
	Outer Diameter of LOAD Cable	18-44 mm.
Grid	R-cable, S-cable, T-cable, N-cable	10 mm²/ 16 mm² * 4 PCS
	PE-cable	10 mm²/ 16 mm² * 1 PCS
	Outer Diameter of GRID Cable	20.5-37mm
	Note: N bar connection in Australia is different from N bar connection in most countries.	
Communication	Communication cable	0.25-0.3mm² * 2 PCS for one communiction port
	Outer Diameter of Communication Cable	6-8.5 mm

2.3   EPS Connection

Connection of X3-PBOX-150kW-G2.1 side

☞ Please refer to the specific inverter user manual for the EPS cable connection of the inverter side.
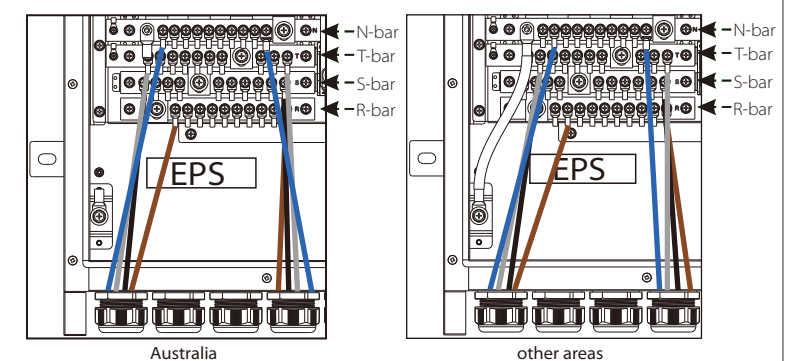
➤ Making EPS cables

Remove 11 mm insulation from cable ends, and then insert the cold-pressed terminal. Press the terminal head with the blank holder.

① cold-pressed terminal   Crimp!   11 mm   ②   N-bar, T-bar, S-bar, R-bar

Inverter	Conductor Cross-section of Grid and EPS cable	Cold-pressed terminal selection
X3-Hybrid G4	4-6 mm²	6-6 terminal
X3-ULTRA	10 mm²	10-6 terminal
	16 mm²	16-6 terminal

➤ Connecting cables

Thread the assembled EPS cable through the corresponding EPS ports at the bottom of the box. Connect the assembled R, S, T, N cable to the R-bar, S-bar, T-bar, N-bar,G-bar. Lock the cables with a screwdriver. (Please refer to the picture on the right.) Torque:3.0 N.m

Australia   other areas

☞ When X3-PBOX-150K-G2.1 is connected with X3-ULTRA inverter, it is recommended that installers connect R, S, T, N cable to the R-bar, S-bar, T-bar, N-bar respectively with one screw hole at intervals in the same row.
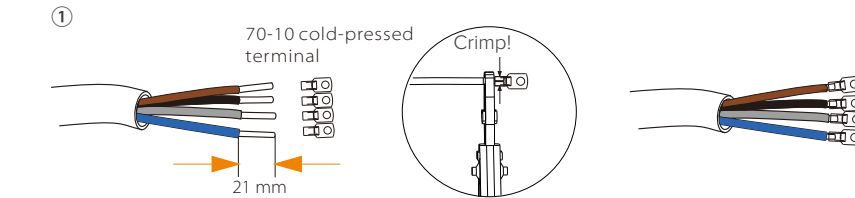
2.4   Back-up Load Connection

**Connection of X3-PBOX-150kW-G2.1 side**

➤ Making Load cables

Remove 21 mm insulation from cable ends, and then Insert the cold-pressed terminal (70-10). Press the terminal head with the blank holder·

① 70-10 cold-pressed terminal   Crimp!   21 mm   ④   R S T N

➤ Connecting cables

Pass the completed wiring harness through the Load port and follow the corresponding wiring ports (R-bar, S-bar , T-bar, N-bar) to install it and tighten the screws. Torque:14.0 N·m (refer to picture as right)

②   LOAD
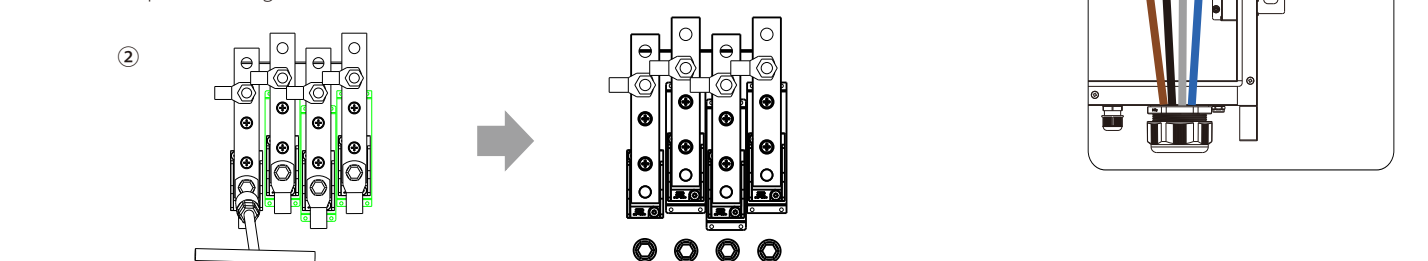
Connection of back-up load side

➤ Selecting appropriate Back-up loads

The requirement shown as below must be satisfied:
1: Algebraic apparent power of back-up loads must be less than Algebraic apparent power of hybrid system * 0.9.
2: Algebraic RCD apparent power of RCD back-up loads must be less than Algebraic apparent power of hybrid system * 0.6.

Back-up Load connection of loads side should be analyzed and operated depending on specific loads. Here will not be described into details.
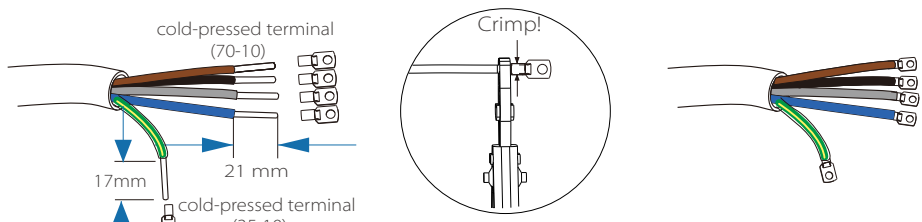
2.5 GRID Connection

Connection of X3-PBOX-150kW-G2.1 side

➢ Making Grid cables

Remove 21 mm insulation from the four cable ends and 17 mm insulation from the PE cable end, and then insert the cold-pressed terminal.

Press the terminal head with the blank holder.

cold-pressed terminal (70-10)
Crimp!
17mm   21 mm
cold-pressed terminal (35-10)

➢ Connecting cables

Thread Grid cables through the GRID port at the bottom of the box to the corresponding Grid ports (R-bar, S-bar, T-bar, N-bar, G-bar) by screwdriver. Torque:14.0 N·m

Note: Users can connect those terminals according to the corresponding stickers. (please refer to picture as below)

For Australia

For Other Areas
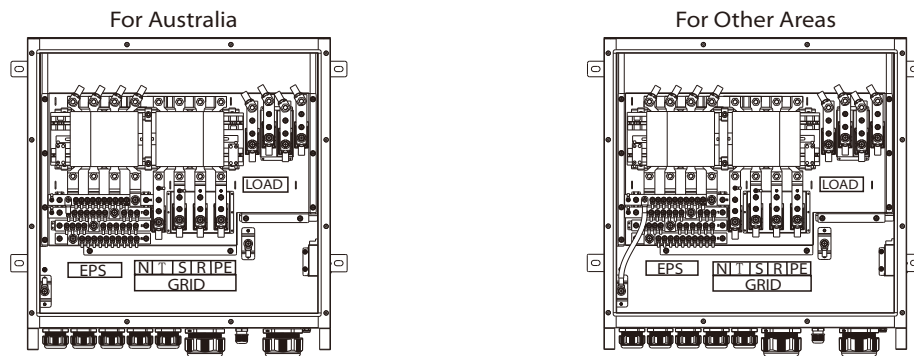
Notice: Grid port connection of grid distribution box side should be analyzed and operated depending on field wiring condition. Here will not be described into details.

2.7 Ground Connection

Step 1: Find a longer ground cable from the accessory package.

①

Ground terminal (length, 250mm)

②

M4 torque wrench
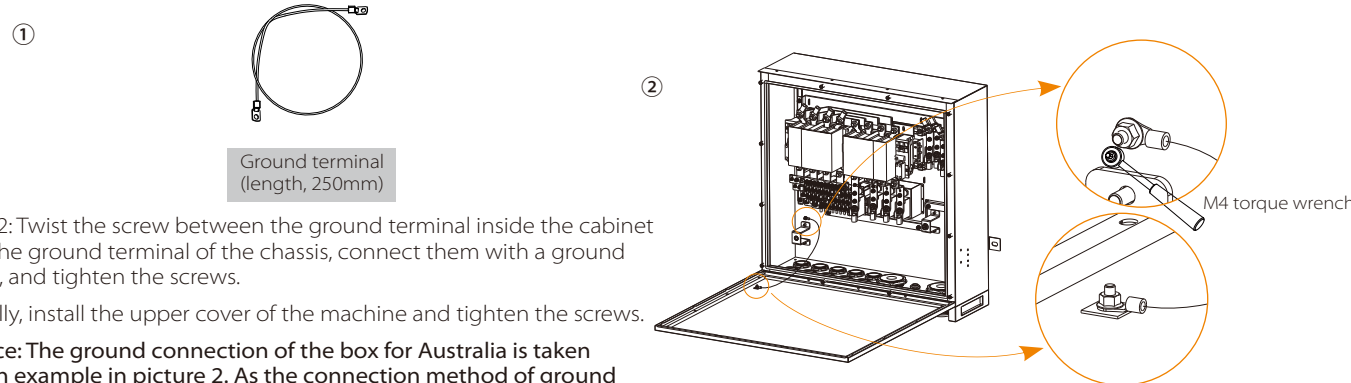
Step 2: Twist the screw between the ground terminal inside the cabinet and the ground terminal of the chassis, connect them with a ground cable, and tighten the screws.

- Finally, install the upper cover of the machine and tighten the screws.

Notice: The ground connection of the box for Australia is taken for an example in picture 2. As the connection method of ground connection of European box is same, please refer to this method.

Part 4   LCD Operation

➢ 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.
Slave mode	Once one inverter is set as a "Master", all other inverters will enter slave mode automatically. slave mode can not be changed from other modes by LCD setting.

➢ "Master Inverter" setting in LCD display

Find the inverter connected with the SolaX meter, then enter the setting page of the inverter LCD screen, click on the parallel settings, and select "master control"; then enter the "resistance switch"and set it to " ON"; Finally, find the last slave in the parallel system and enter the setting page of the inverter LCD screen and set the "resistance switch" to "ON".
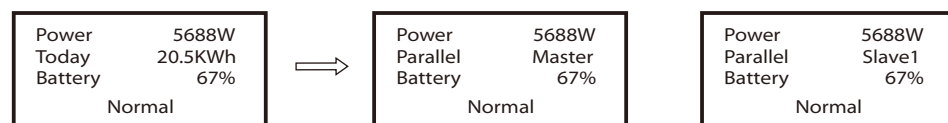- If one inverter want to exit from this parallel system, please do the steps as below:
step 1: Disconnect all the network cables on the CAN port.
step 2: Disconnect all power cables (R/S/T/N/PE) connected to X3-PBOX-150kW-G2.1.
step 3: Enter setting page and click parallel setting, and choose "Free".

Setting		Parallel Setting		Parallel Setting
Battery Parallel Setting Reset	⇒	Status Free >setting Master	⇒	> Resistance Switch ON
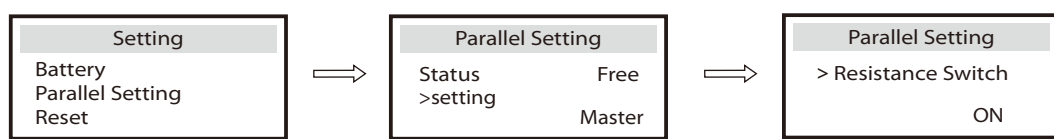
Notes: Once this inverter is set as a "Master",all other inverters will enter "slave mode" automatically.
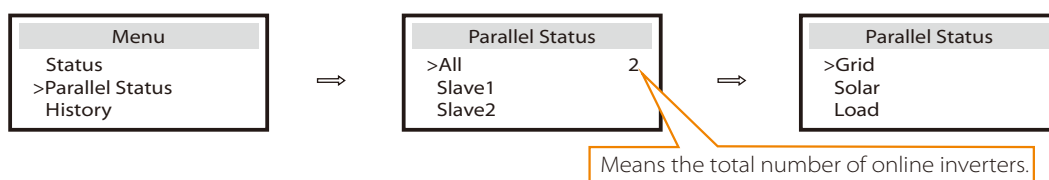
➢ Main display:

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

Power 5688W Today 20.5KWh Battery 67% Normal	⇒	Power 5688W Parallel Master Battery 67% Normal	⇒	Power 5688W Parallel Slave1 Battery 67% Normal

➢ Status display:

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

Menu		Parallel Status		Parallel Status
Status >Parallel Status History	⇒	>All 2 Slave1 Slave2	⇒	>Grid Solar Load

Means the total number of online inverters.

Part 5   Appendix

In this chapter, the difference of the EPS connection, communication connection and installation of parallel system of X3-Hybrid/Fit G2 inverter will be displayed here. If users need to apply X3-Hybrid/Fit G2 inverter, please refer to the following parts.

5.1 EPS Connection

Connection of Inverter side (please refer to Inverter User Manual for details)

Only how to screw wires of X3-Hybrid/Fit G2 inverter is to be written here. Please keep the connection of other parts of the inverter same as that of X3-Hybrid G4.

➢ Connecting cables

Insert R(L1),S(L2),T(L3),N wires into corresponding ports of EPS terminal and screw them tightly.
(For specific installation steps, please refer to the EPS port installation chapter of the X3-Hybrid/Fit Quick Installation Guide.)
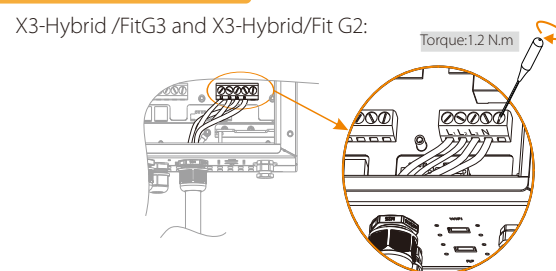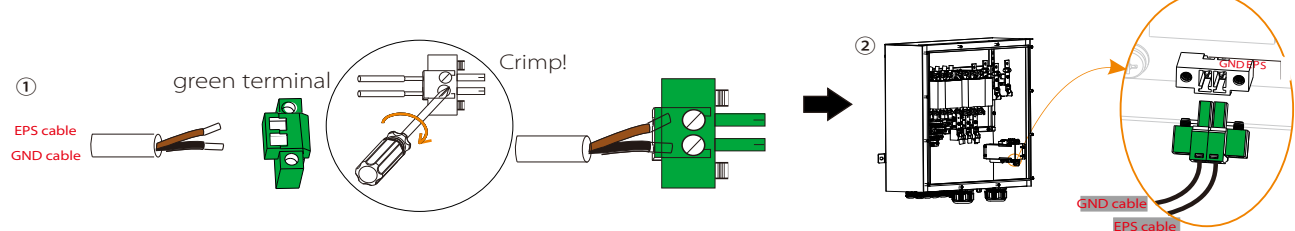
X3-Hybrid /FitG3 and X3-Hybrid/Fit G2:   Torque:1.2 N·m

5.2 Communication Connection

Connection of X3-PBOX-150kW-G2. 1 side

➢ Making communication cables

When users apply X3--Hybrid/Fit G2 inverter, please connect as follows:
Remove 4mm insulation from cable ends.
Insert the cable into the green terminal in the accessory bag, then use a screwdriver to tighten the cable and insert it into the corresponding port. Torque:0.2±0.1 N·m

①   green terminal   Crimp!

EPS cable
GND cable

②

GND cable
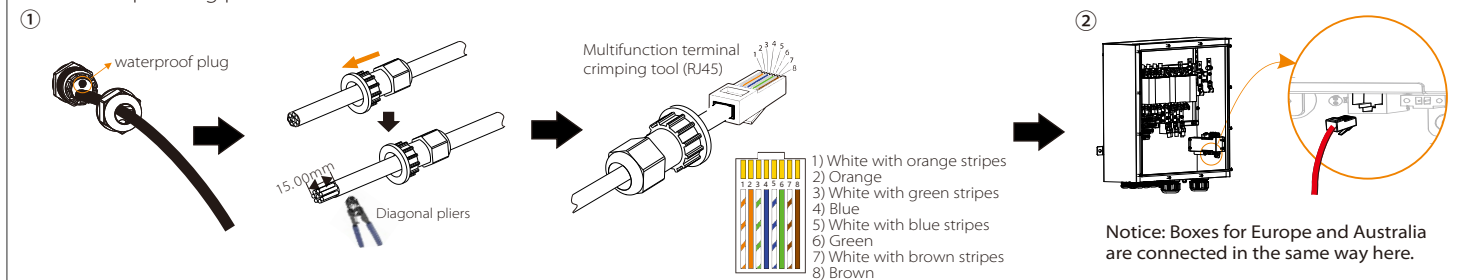EPS cable

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2.6 Communication Connection

Connection of X3-PBOX-150kW-G2.1 side

➢ Making communication cables

When users apply an inverter, please follow the steps below:
Find a common network cable and Remove 4 mm insulation from cable ends.
Insert the cable into the RJ45 terminal in the accessory kit, and then use a diagonal pliers to tighten the cable and insert it into the corresponding port.

①   waterproof plug

Multifunction terminal crimping tool (RJ45)

Diagonal pliers

1) White with orange stripes
2) Orange
3) White with green stripes
4) Blue
5) White with blue stripes
6) Green
7) White with brown stripes
8) Brown

②

Notice: Boxes for Europe and Australia are connected in the same way here.

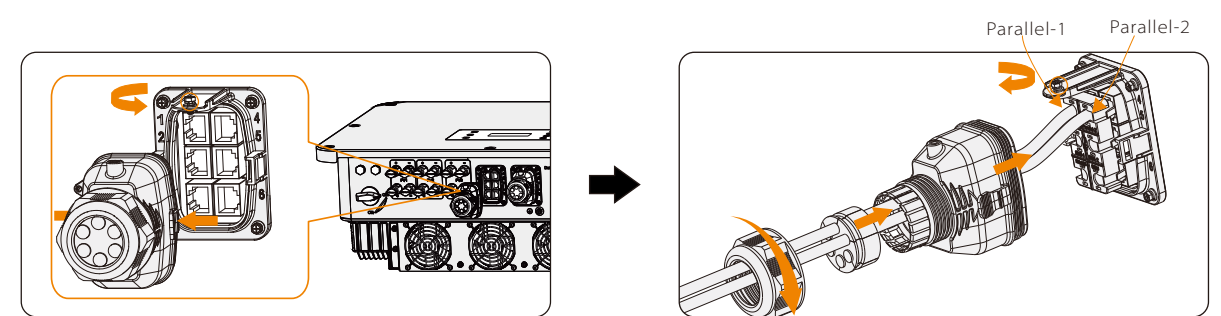### Connection of Inverter side (please refer to Inverter User Manual for details)

When users apply X3-Hybrid G4 inverter, please connect as follows:
* Note: It is best to connect the CAN port on the left of "Master" to X3-PBOX-150kW-G2.1, Master CAN and connect the CAN port on the right to "Slave".   Slave CAN

①

②

CAN CAN DRM SHUT
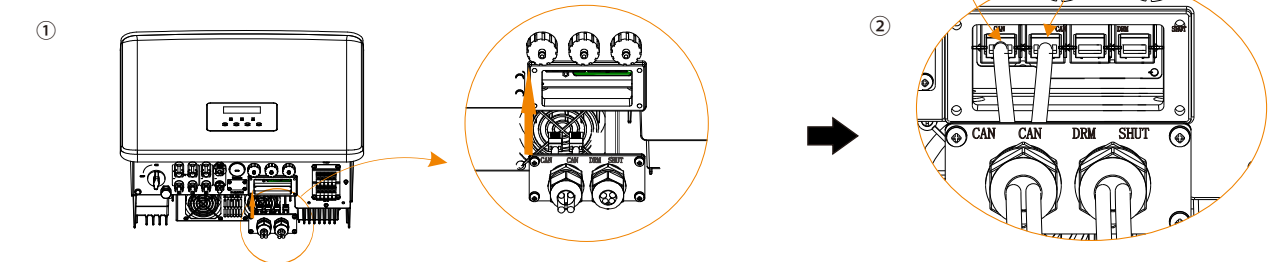
When users apply X3-ULTRA inverter, please connect as follows:

Master inverter Parallel-1 connects to the COM terminal of X3-PBOX-150kW-G2.1. Master inverter Parallel-2 connects to Slave 1 inverter Parallel-1. Slave 1 Parallle-2 connects to Slave 2 Parallel-1; other inverters are connected in such way.

Parallel-1   Parallel-2

Part 3   Installation of Parallel System

CAN1-CAN2 Connection of X3-Hybrid Inverter (please refer to Inverter User Manual for details)

➢ CAN-CAN connnection:

Insert one side of CAT5 cable into the master inverter's CAN1 port and the other side into X3-PBOX-150kW-G2.1's COM port. Master inverter CAN2 connects to Slave 1 inverter CAN1. Slave 1 CAN2 connects to Slave 2 CAN1; other inverters are connected in such way.
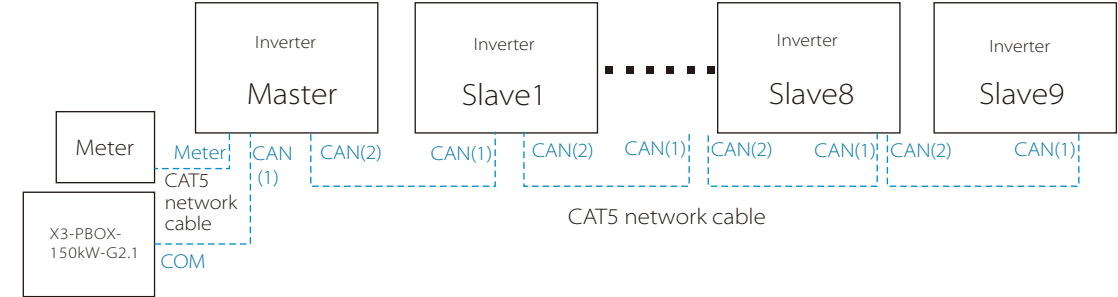
➢ RS485-Meter connection:

Insert one side of CAT5 network cable into the RS485 port of a meter, and the other side into the Meter/CT port of the master inverter.
Please note the inverter connected with meter will be the master inverter and this master inverter must be connected with battery.

When users apply X3-Hybrid G4 inverter, please connect as follows:
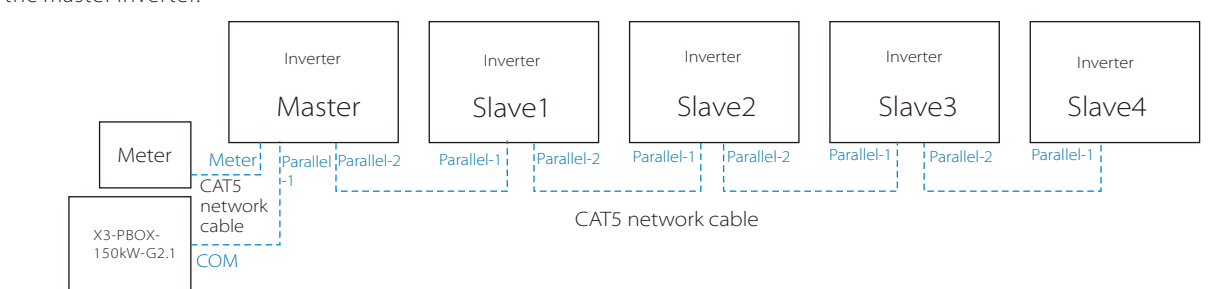Note: The installation method of X3-Hybrid/Fit G2 inverter is placed in the attachment.

	Inverter Master	Inverter Slave1	Inverter Slave8	Inverter Slave9
Meter				
Meter CAT5 network cable	Meter(1)	CAN(1) CAN(2)	CAN(1) CAN(2) CAN(1) CAN(2)	CAN(1)
X3-PBOX-150kW-G2.1 COM		CAT5 network cable		

Parallel 1-Parallel 2 Connection of X3-ULTRA Inverter (please refer to Inverter User Manual for details)

➢ Parallel 1-Parallel 2 connnection:

Insert one side of CAT5 cable into the master inverter's Parallel1 port and the other side into X3-PBOX-150kW-G2.1's COM port. Master inverter Parallel 2 connects to Slave 1 inverter Parallel 1. Slave 1 Parallel 2 connects to Slave 2 Parallel 1; other inverters are connected in such way.

➢ RS485-Meter connection:

Insert one side of CAT5 network cable into the RS485 port of a meter, and the other side into the Meter/CT terminal of COM2 port of the master inverter.
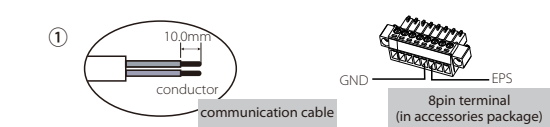
	Inverter Master	Inverter Slave1	Inverter Slave2	Inverter Slave3	Inverter Slave4
Meter					
Meter CAT5 network cable	Parallel(1) Parallel-2	Parallel-1 Parallel-2	Parallel-1 Parallel-2	Parallel-1 Parallel-2	Parallel-1
X3-PBOX-150kW-G2.1 COM		CAT5 network cable			

5.2 Communication Connection

Connection of Inverter side (please refer to Inverter User Manual for details)
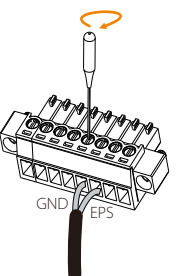
When users apply X3-Hybrid/Fit G2 inverter, please connect as follows:

➢ Step 1 : prepare a connector and two communication cables.

①   10mm
conductor
communication cable
GND EPS
8pin terminal (in accessories package)

➢ Step two : insert the cables

Unscrew the nut of connector on the bottom of the inverter and insert two communication cables through it.
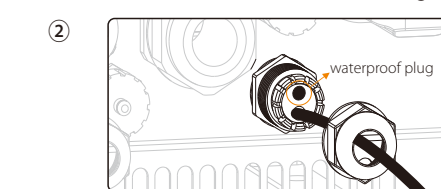
②   waterproof plug

➢ Step three : screw the cables

Disconnect the insulation layer of the communication cable, and then insert one side of the cable corresponding to the GND and EPS port into the pin5 and pin6 holes of the 8-pin positive terminal in the accessory bag. Torque: 0.2±0.1 N·m
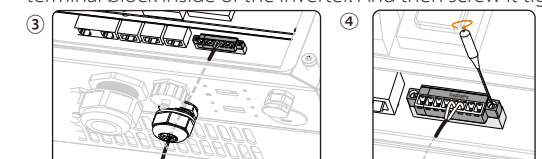
GND EPS
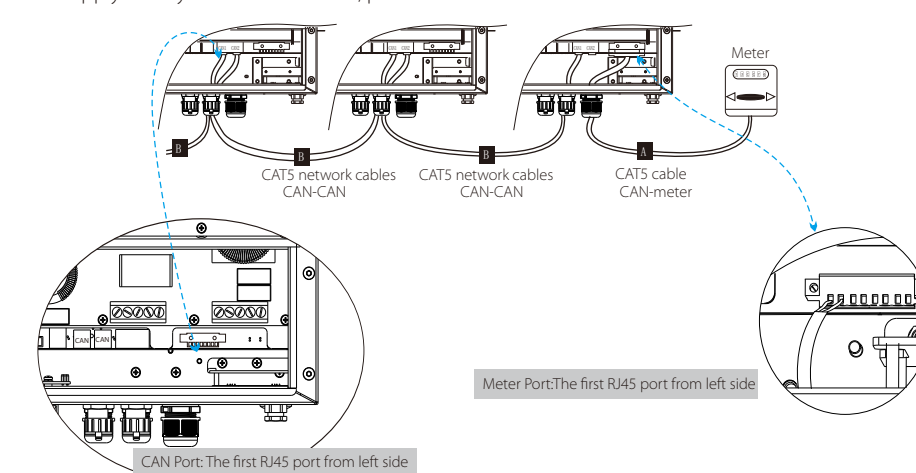
➢ Step four : screw the terminal

Insert the positive terminal into the corresponding negative terminal block inside of the inverter. And then screw it tightly.

③   ④

Torque:0.4±0.1 N·m

5.3 Installation of Parallel System

When users apply X3–Hybrid/Fit G2 inverter, please connect as follows:

Meter

CAT5 network cables   CAT5 network cable   CAT5 cable
CAN-CAN   CAN-CAN   CAN-meter

Meter Port:The first RJ45 port from left side

CAN Port: The first RJ45 port from left side

Note: For specific cable operation of these cables, please refer to Inverter User Manual.