



# **AC Switching Cabinet**

X3-PCAB-750kW-A

**Installation Manual** 

Version 4.0

www.solaxpower.com



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### Safety

#### General Notice

- 1. Contents may be periodically updated or revised. SolaX reserves the right to make improvements or changes in the product(s) and the program(s) described in this manual without the prior notice.
- 2. The installation, maintenance and grid-related setting can only be performed by qualified personnel who:
  - Are licensed and/or satisfy state and local jurisdiction regulations;
  - Have good knowledge of this manual and other related documents.
  - A medium-voltage operator is required to obtain any Certifications for High-voltage Electrician.
- 3. Before installing the device, carefully read, fully understand and strictly follow the detailed instruction of the user manual and other related regulations. SolaX shall not be liable for any consequences caused by the violation of the storage, transportation, installation, and operation regulations specified in this document and the user manual.
- 4. Use insulated tools when installing the device. Individual protective tools must be worn during installation, electrical connection and maintenance.
- 5. Please visit the website www.solaxpower.com of SolaX for more information.

#### Safety Instruction

For safety reasons, installers are responsible for familiarizing themselves with the contents of the manual and all warnings before performing installation.

#### Descriptions of Labels



CE mark of conformity



TUV certification



Grounding point



Additional grounding point



Caution, risk of danger



Caution, hot surface



Caution, risk of electric shock



Read the enclosed documentations.



Do not dispose of the cabinet together with household waste.

### **⚠** DANGER!

According to the local laws and regulations related to high-altitude work, operators
must wear PPE, e.g., a helmet, safety belt, or waist harness, when they work at
heights, while the other end of the harness must connect to a secure structure to
prevent fall incidents.

### **!** DANGER!

- Please make sure that the unit is free from any damage before the electrical connection
- Do not modify, change, or dismantle the device, do not change the power-on and power-off sequences and the installation procedure written in the document, and please properly and correctly operate it.
- Do not power on the device during installation. Otherwise, it may cause a fire, personal injury, or device damage.
- Must remove earrings, rings, bracelets, watches, and any other metal jewelry before
  operation, to avoid electrical shock, burns, or even death.
- During operation, special insulated tools must be used to avoid electric shock or short circuit failure. The insulated tools' voltage ratings must exceed the system voltage ratings. Please refer to "Technical Data" for system information.

### 

#### **EMC**

• This is a class A device. Operating this device in a residential area may cause radio interference, and the user might need to take appropriate measures in such cases.

### **!** WARNING!

- Please prepare tools that meet the requirements before installation, and check the number of tools after installation, to avoid leaving them inside the equipment.
- Please ensure that the cabinet has been thoroughly secured before operating it.
   Otherwise, it may cause personal injury or equipment damage due to tilting or collapsing the cabinet.
- Please ensure that the cabinet's vents and cooling system are working properly when it is running. If the vents are blocked, it will lead to overheating, and even equipment damage or fire hazard.
- Please ensure that the cabinet's vents and cooling system are kept away from heat sources.
- Do not drill holes in the device to avoid equipment failure.
- If the circumstances that may cause personal injury or equipment failure occur, such as, fluid flowing into the equipment, stop operation and power off immediately.
   Otherwise, it may cause a short circuit or damage.
- Do not open the cabinet doors on a rainy or high humid day (≥80% humidity). If the doors have to be opened on such days, please take proper protective measures.



- Overvoltage protection with surge arresters should be provided when the PV system is installed. The grid connected inverter is fitted with SPDs on both PV input side and MAINS side.
- Please consult professionals before installing SPDs.
- Make sure that the input DC voltage does not exceed the maximum DC input voltage specified for the inverter. Overvoltage can cause irreversible damage to the inverter, and such damage is not covered by the warranty.
- PV modules should have an IEC61730 class A rating.

### / WARNING!

- Operators must wear PPE while installation and maintenance of the device.
- Never connect or disconnect the AC and DC connector while the PCS is running.
- Prior to conducting any maintenance, turn off the AC and DC power and disconnect them from the PCS. Wait for 15 minutes to fully discharge the energy.
- Avoid touching the PCS while it is running, as it becomes hot during operation and may cause personal injuries.

### / WARNING!

- Please wear PPE, such as, protective clothing, insulating shoes, goggles, safety helmets, insulating gloves, etc., when conducting electrical wiring.
- Do not touch the power supply equipment directly, or through conductors or damp objects.
- Do not touch the parts of the equipment of which warning signs are attached, to avoid personal injury or device damage.

### **№** WARNING!

• When the system is operating off-grid, do not close the QF-GRID breaker without permission.

### CAUTION!

- Do not use a straight ladder. When electrical work is involved, a wooden ladder or an
  insulated ladder shall be used.
- The equipment shall not be used to provide a backup power source in the following circumstances:
  - Equipment related to life;
  - Sensitive precision instruments;
  - c. Home appliances will be faulty in the case of a power failure during operation.
- Do not power on the equipment until it has been installed and confirmed by professionals.
- In the event of a fire, evacuate immediately and call the local fire services.



- Make sure that children are supervised to prevent them from playing with the inverter.
- Pay attention to the weight of the inverter and handle it properly to avoid personal injuries.

### **!** CAUTION!

- Do not power on the device until it has been installed and confirmed by professionals.
- In the event of a fire, evacuate immediately and call the local fire services.

#### NOTICE

 The signs and messages on the labels and nameplates attached to the device need to be visible and clear.

#### NOTICE!

- Please operate according to the safety code for power station.
- Before installation, it is necessary to set up temporary safety fences or warning lines and hang warning signs in the operation area, to prohibit non-staff from entering here
- Please make sure that the equipment and its associated switches are off before connecting and disconnecting power cables.
- Please check whether the protective housing and insulating sleeve for an electrical component have been installed correctly after finishing installation, to avoid electric shock.
- Must turn off the output switch of the power supply equipment when maintaining its electrical terminal device and power distribution device.
- If the device is required to be powered off during troubleshooting and diagnosis, please do as the following procedure: power off > electricity testing > connecting grounding cable > hanging warning signs and setting up guardrails.
- Must hang up "Do Not Switch On" warning signs on the relevant switches or circuit breakers before completing maintenance, to prevent power connection. Do not switch on before the fault is solved.
- Do not use water, alcohol, oil, or other solvents when cleaning electrical components inside and outside the device.

#### NOTICE

#### Grounding Requirements:

- The device's grounding impedance shall meet the requirements of local electrical safety standards.
- The equipment shall be permanently connected to a grounding wire within the building's electrical system. Please check whether the device is reliably grounded before operation. The grounding cable should be removed last while dismantling and maintaining the device.
- Do not start the device if it is not fitted with a grounding conductor.
- All acts against the grounding conductor are prohibited.
- If the device is equipped with a three-pronged socket, make sure that the ground prong is reliably grounded.
- For the device that may generate large contact currents, please make sure that the grounding terminal on the housing has been grounded before powering on, to avoid electric shock.

#### Cable Requirements:c

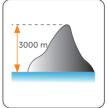
- When deciding the wire diameter, and connecting or wiring cables, follow the local laws, regulations, and codes to ensure safety.
- When external conditions (e.g., placement method, ambient temperature, etc.)
  change, the cable type must be verified according to IEC-60364-5-52 or local laws,
  regulations and standards. For instance, whether the cable's current-carrying capacity
  meets the requirements.
- Before connecting power cables, please make sure that the cable labels are correctly labelled and the cable terminals are well insulated.
- Do not loop and twist cables while conducting electrical wiring. If the length of the
  power cable is not enough, please replace it instead of joining or welding. Ensure that
  all the cables of the correct type and size are fully connected and well insulated, and
  the edges of cable slots and crossing holes are smooth.
- It is recommended to bundle similar cables with cable ties, to ensure that the inside of the device is neat and tidy and to avoid cable jacket damage.
- Please use fireproof mud to seal the threading openings immediately after finishing wiring, to avoid the entry of water vapour or small animals.
- Cables should be kept away from heaters or other heat sources, because a high temperature environment may result in aging and damage to cable insulation.

### **Preparation before Installation**

#### Installation Site















Avoid flammable, explosive materials or dust







Avoid strong electromagnetic fields and antenna



Avoid strong vibration and noise



Avoid radiation



Avoid conductive and magnetic dust



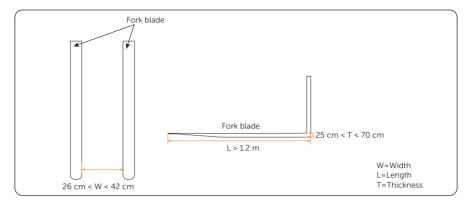
Avoid toxic and harmful gases



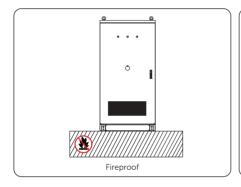
Avoid microbial growth

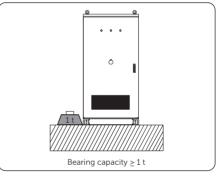
Installation Site	Distance
Distance from the device to the coast	> 2000 m
Distance from the device to the high heavily polluted area, for instance, smelting plant, coal mine, thermal power plant, etc.	> 1500 m
Distance from the device to the moderately polluted area, for instance, chemical plant, rubber plant, electroplate factory, etc.	> 1000 m
Distance from the device to the lightly polluted area, for instance, food factory, leather factory, heating boiler, slaughter house, dumping site, sewage treatment plant, etc.	> 500 m

### Forklift Requirement

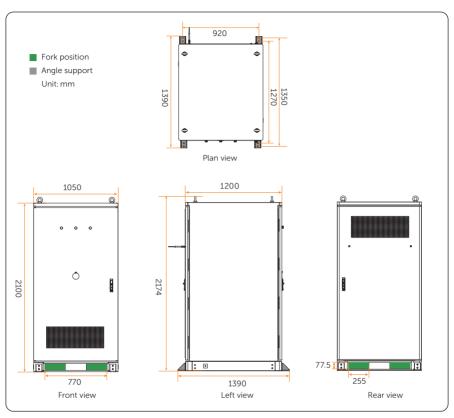


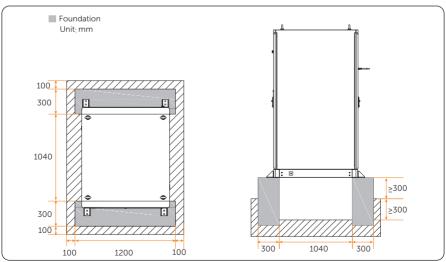
### Installation Carrier





#### Dimension and Installation Foundation



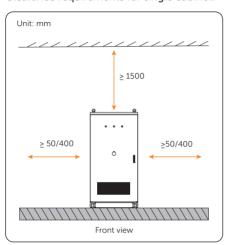


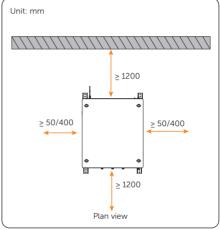
#### Installation Space

#### NOTICE

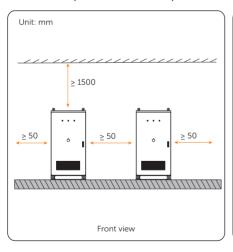
- When placed side by side with SolaX energy storage cabinets, the clearance between the switching cabinet and SolaX cabinets should be at least 50 mm;
- When placed side by side with other objects such as firewalls, the clearance should be at least 400 mm;

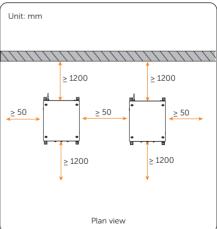
#### Clearance requirements for single cabinet:





#### Clearance requirements for multiple cabinets:





#### Installation Tools







Measuring tape



Utility knife





Diagonal pliers



Wire cutter



Vacuum cleaner



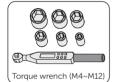


Crimping tool for RJ45



Hydraulic wire crimper

















Load capacity:≥ 1t











Additionally	Required	Materials
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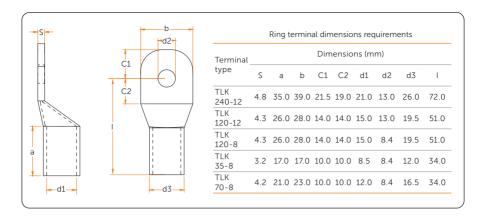
No.	Required	material	Cable Type	Conductor Cross-section	Quantity
1	Grid cable		4-core copper cable	≥240 mm²	3 groups

No.	Required	material	Cable Type	Conductor Cross-section	Quantity
2	Load cable		4-core copper cable	≥240 mm²	3 groups
7	DCC apple	1/2	4-core copper	≥35 mm² (for AELIO system)	10 groups
3 PCS cable		cable	≥70 mm² (for TRENE system)	6 groups	
4	PE wire	O	Conventional yellow and green cable	≥120 mm² (for grid, load and cabinet grounding)	1
5	Network cable	4	Network cable CAT5E	/	/
6	COM cable		Shielded twisted-pair cable	0.5 mm²	/

#### NOTICE

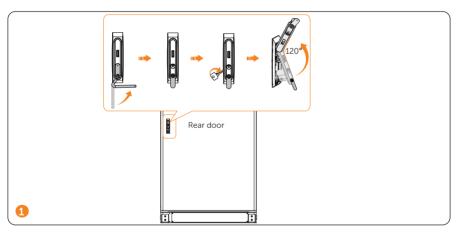
When used with AELIO system, the total communication distance through network cables among the cabinets shall be within 70 meters to ensure stable data transmission. When used with TRENE system, the total communication distance through network cables among the cabinets shall be within 50 meters to ensure stable data transmission.

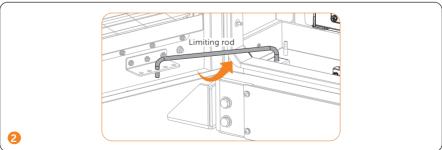
No.	Required material		Type (Recommended)	Quantity	Description
7			TLK240-12	24	For connecting the power cables of the grid and load
8	_		TLK120-12	2	For cabinet grounding
9	Ring terminal		TLK120-8	6	For load grounding
10	-		TLK35-8	24	For PCS connection (35 mm2 power cable in AELIO system)
11	_		TLK70-8	24	For PCS connection (70 mm <sup>2</sup> power cable in TRENE system)

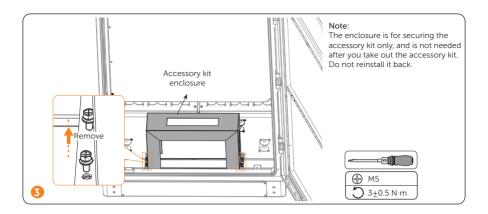


### Packing List

### Procedure to Take Out the Accessory Kit (At the Rear Door)



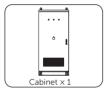




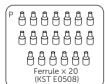
#### NOTICE!

The Installation Manual is placed in the file pocket on the front door of the cabinet.

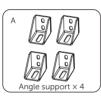
#### Packing List









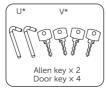


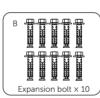


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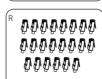
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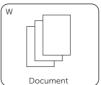


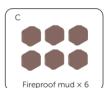


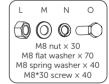














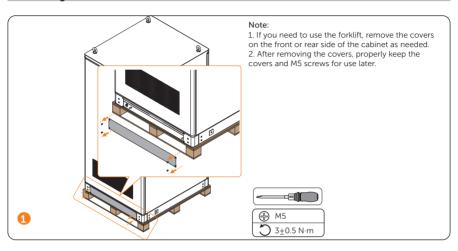
RJ45 connector enclosurex 22

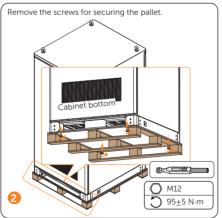
#### NOTICE

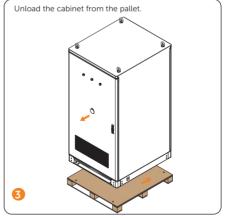
- The accessory kit is placed under the sheet metal enclosure at the rear of the cabinet.
- U\* and V\* are collected in a bunch, and are inserted into the door lock upon delivery.

### **Mechanical Installation**

### Removing the Wooden Pallet







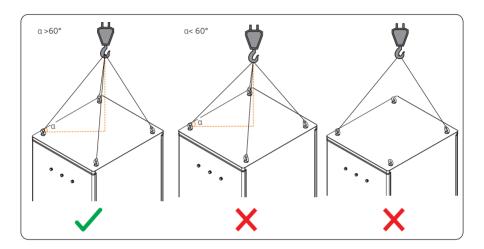
#### Using the Crane/Forklift

Select either equipment to place the cabinet on the defined installation site.

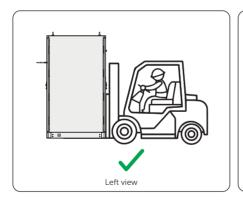
### Crane position

#### NOTICE

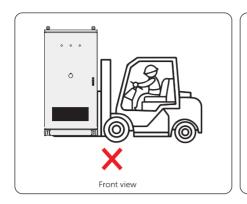
• Before threading ropes, check and make sure the eye bolts are securely installed on the top of the cabinet.



### Fork Position

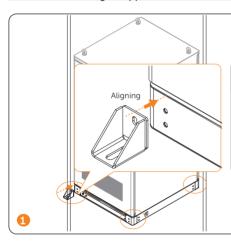






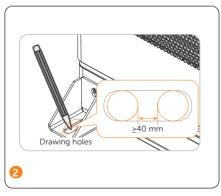


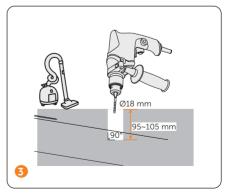
### Installation of Angle support and Cover

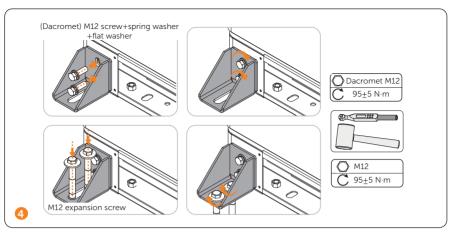


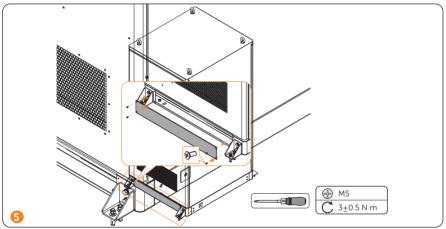
#### NOTICE

 Pay attention to the direction of the angle support. The side with two holes should be upright, and the side with a long hole should be placed against the foundation.

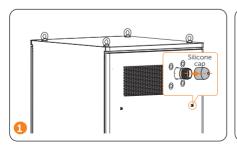


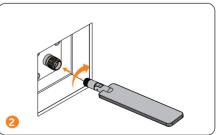




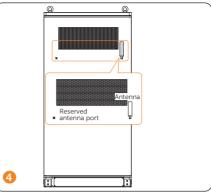


### Installation of Antenna









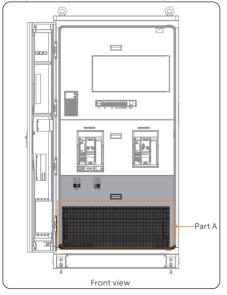
#### NOTICE!

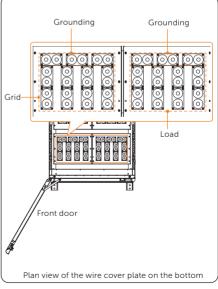
- An additional antenna port is available. The antenna connection procedure of this terminal is the same as the designated antenna port.
- Keep the sealing caps on if the antenna ports are not used.

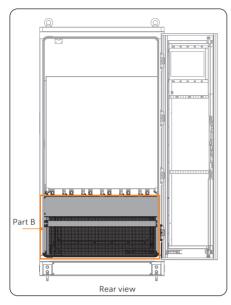
### **Electric Connection**

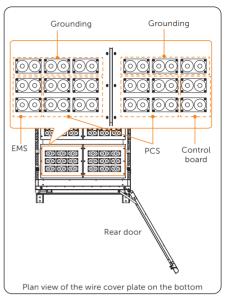
#### Position of the Wired Parts

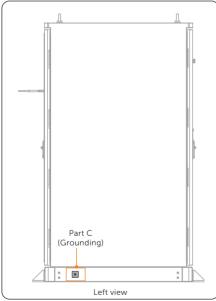
The general location of the wiring modules are as follows:

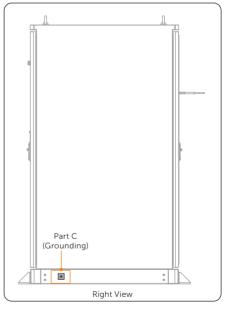












#### Preparing the PE cable and power cable

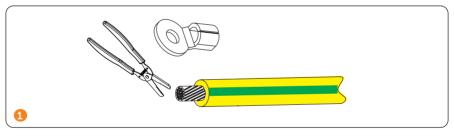
#### NOTICE

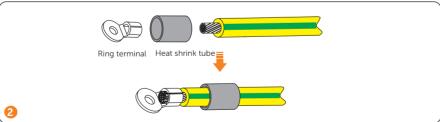
- This section introduces the steps to make PE cable and power cable for grid connection, load connection and PCS connection of the cabinet. These connections share the same procedure for making cables.
- For grid, load and PCS connection, the PE cable must be connected first before connecting the power cables.

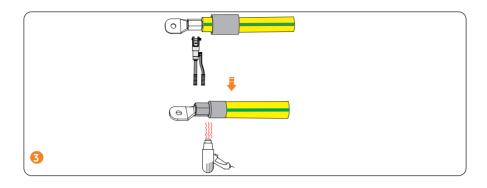
### Preparing PE cable

The cable specification and strip length of the PE cables vary depending on the different connections. See the table below for details.

Connection Type	Cable Specification	Specification of Heat Shrink Tube	Terminal Type (Recommended)	Jacket Stripe Length
Cabinet	- 120 mm²	Diameter: Ø20-25 mm	TLK120-12	70
Load	120 mm	Length: 70-80 mm	TLK120-8	30 mm

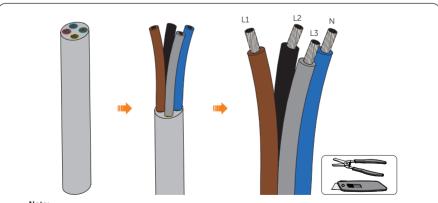






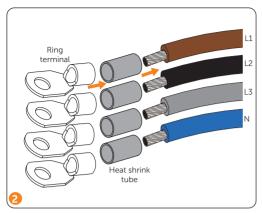
### Preparing the Power cable

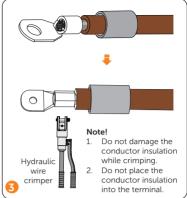
Connection Type	Ring Terminal Type	Specification of Heat Shrink Tube	Jacket Stripe Length	Insulation Stripe Length	
Grid	TLK240-12	Diameter: Ø30-35 mm	700-800 mm	40 mm	
Load		Length: 80-90 mm			
PCS (TRENE)	TLK70-8	Diameter: Ø20-25 mm Length: 60-70 mm	- 500-600 mm	25 mm	
PCS (AELIO)	S (AELIO) TLK35-8 Diameter: Ø1 Length: 50-		- 300 000 111111	20 mm	

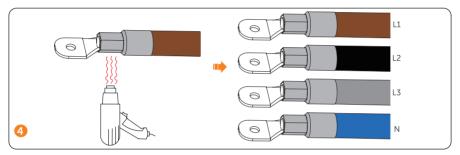


#### Note:

- 1. It's important to give the power cable a health check before stripping it.
- 2. It's necessary to use controlled motion to strip the insulation down the wire, to prevent damage to the wires.
- Make sure that the insulation layer has been stripped to a sufficient length so that the center conductor is fully exposed without any damage or nicks. In addition, make sure that no extra insulation remains beyond the connector once it's crimped on.



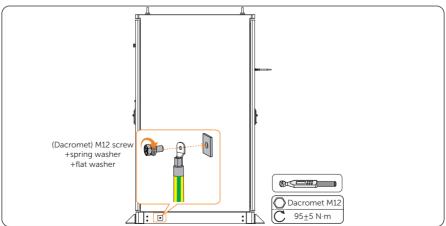




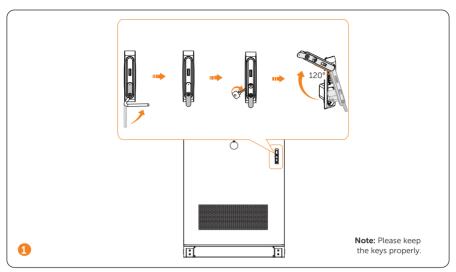
### **Grounding Connection**

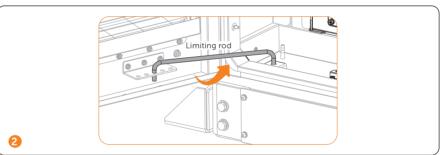
#### NOTICE

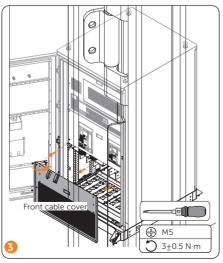
• The cabinet offers 2 ports for grounding the cabinet at the left and right side. Select either port to perform grounding connection.

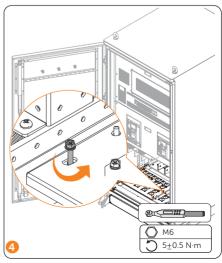


### Grid Connection

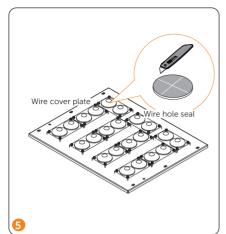


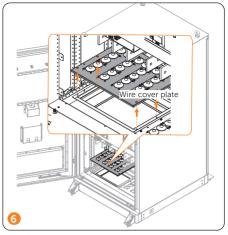


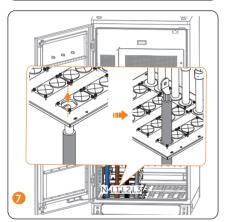


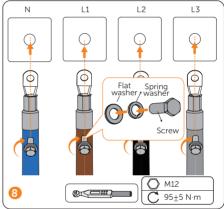


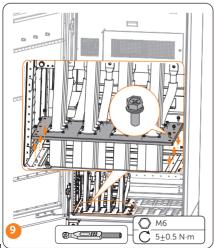
23

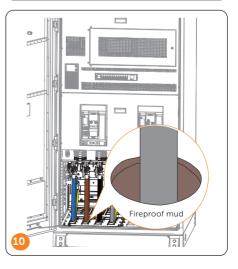




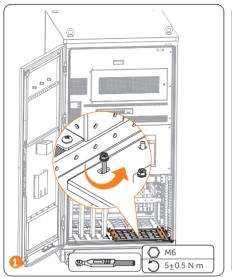


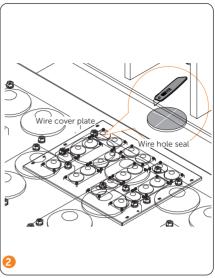


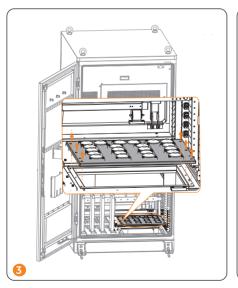


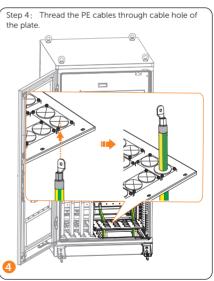


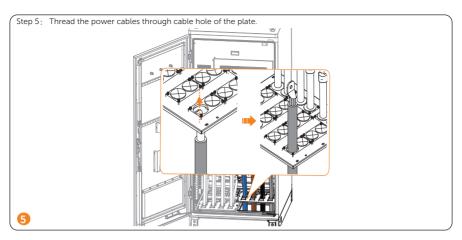
### Load Connection

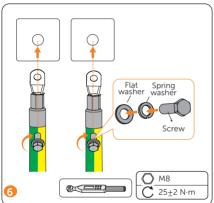


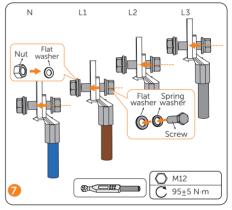


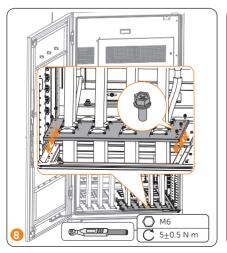


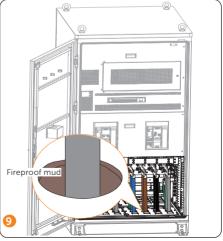


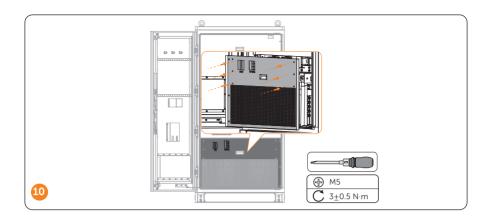










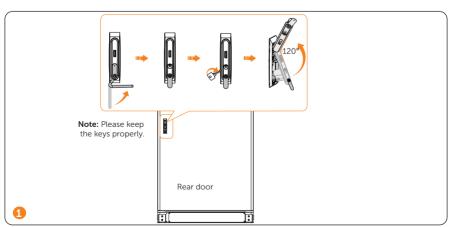


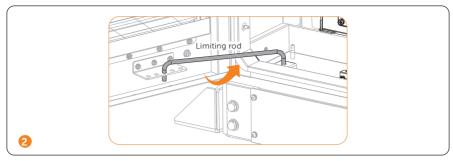
#### PCS Connection

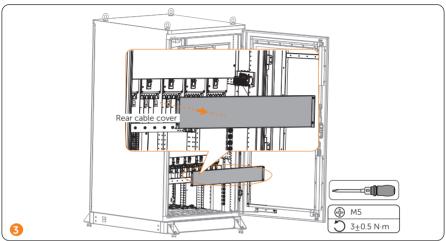
#### NOTICE!

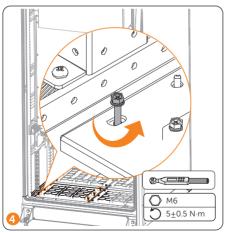
- Two types of power cables are supported for PCS: 35mm² and 70mm². The wiring steps of the two types of cables only differ in the number of wires connected to each terminal. The identical wiring steps use 50mm² power cables for example.
- For 70mm<sup>2</sup> power cable, totally 6 groups of 4-core copper cables are required, with
  each PCS terminal connected to a wire; For 35mm<sup>2</sup> power cable, totally 10 groups of
  4-core copper cables are required, with each of 4 PCS terminals connected to two
  wires, and each of 2 PCS terminals connected to one wire. Users can decide how do
  they distribute the connection terminal and wires.

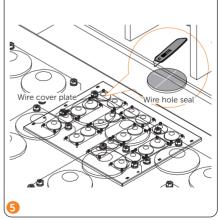
No.	Rated Power of PCS	Cable Specification Required	Quantity
1	≤60 kW	35 mm <sup>2</sup> cooper wire	10 groups
2	60-125 kW	70 mm² cooper wire	6 groups

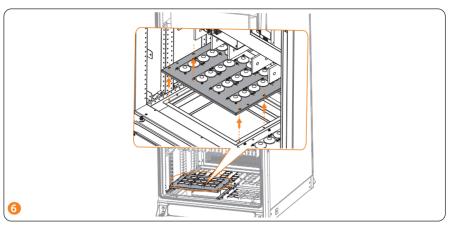


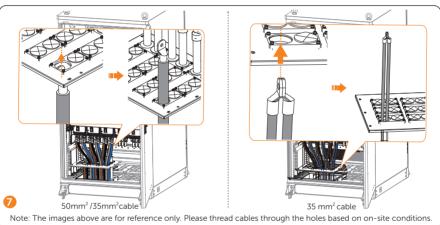


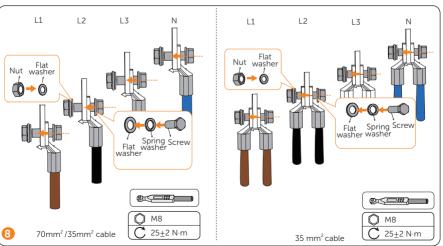


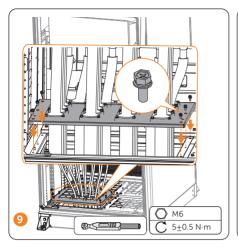


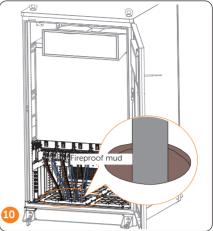


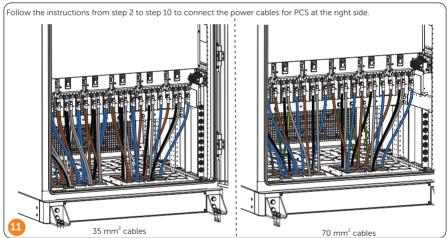












#### Network Connection

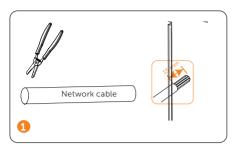
The cabinet offers 22 network ports in total, 11 on each side of the cabinet rear.

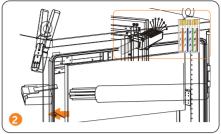
#### NOTICE!

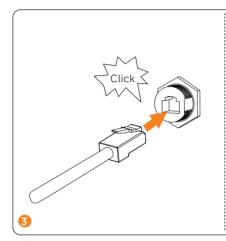
• The 11 network ports at the left side are for data exchange with the energy storage cabinets, and the other 11 ports at the right side are for communication control.

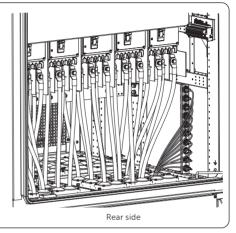


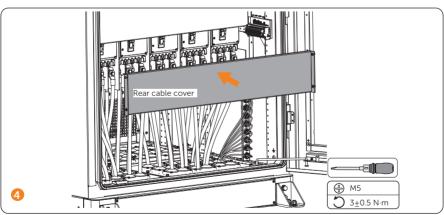
PIN No.	Color	PIN No.	Color
1	Orange-White	5	Blue-White
2	Orange	6	Green
3	Green-White	7	Brown-White
4	Blue	8	Brown







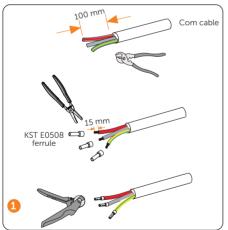


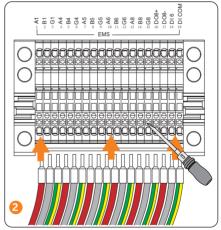


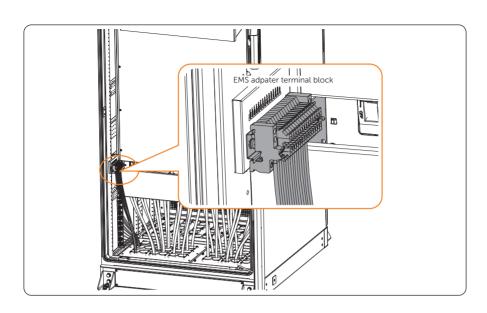
### **EMS Connection**

EMS adapter terminal block is on the left of the cabinet rear.

No.	Marking	Description	No.	Marking	Description
1	EMS: A1	- Connected to SolaX — MEGA and Forth PV - inverters —	10	EMS: A6	Reserved
2	EMS: B1		11	EMS: B6	
3	EMS: G1		12	EMS: G6	
4	EMS: A4	- Connected to diesel - generator through - communication mode -	13	EMS: A8	Connected to grid- connected meter
5	EMS: B4		14	EMS: B8	
6	EMS: G4		15	EMS: G8	
7	EMS: A5	Connected to third- party PV inverters	16	EMS: DO8+	Connected to diesel generator through dry contact
8	EMS: B5		17	EMS: DO8-	
9	EMS: G5		18	EMS: DI6	
			19	EMS: DI COM	



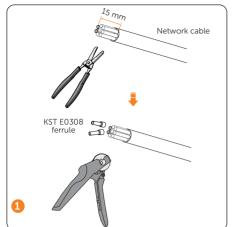


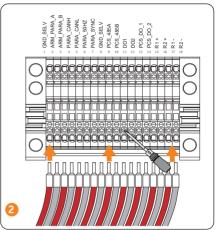


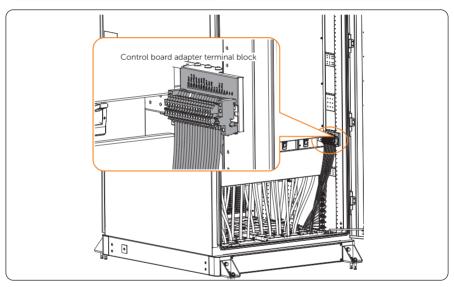
#### **Control Board Connection**

Control board adapter terminal block is on the right of the cabinet rear.

	'				
No.	Marking	Description	No.	Marking	Description
1	GND_SELV	For parallel connection with TRENE systems (excluding TRENE-P100B215I)	11	DO_1	- Reserved
2	ARM_PARA_A		12	DO_2	
3	ARM_PARA_B		13	PCS_DO_1	
4	PARA_CANH		14	PCS_DO_2	
5	PARA_CANL		15	R1+	For resistor connection when
6	PARA_50HZ		16	R2+	
7	PARA_SYNC		17	R1-	connected to _AELIO systems
8	GND_SELV		18	R2-	
9	PCS_485A	For parallel connection with AELIO systems and TRENE-P100B215I			
10	PCS_485B				

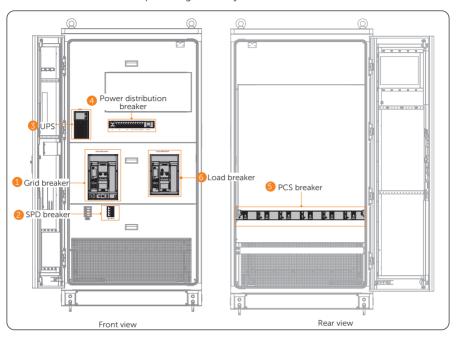






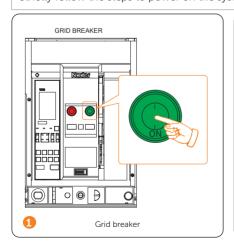
#### **System Power-on**

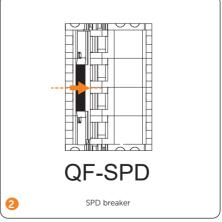
The location of modules for powering on the system are as follows.

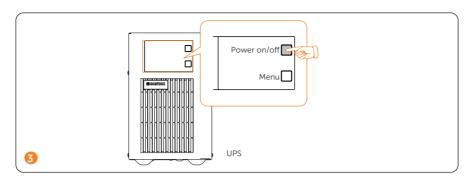


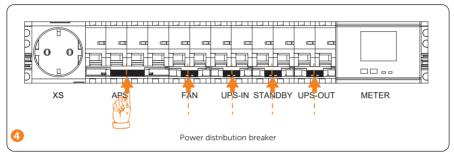
### ∕!\ CAUTION!

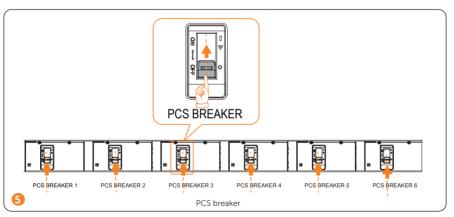
Strictly follow the steps to power on the system.

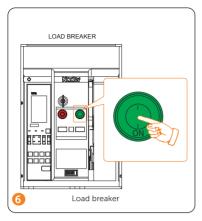


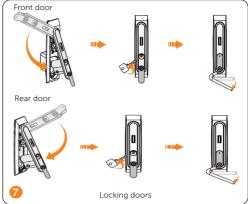












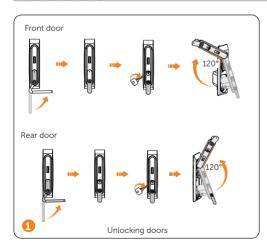
#### NOTICE

• Make sure you have locked the doors well after normally powering on the system.

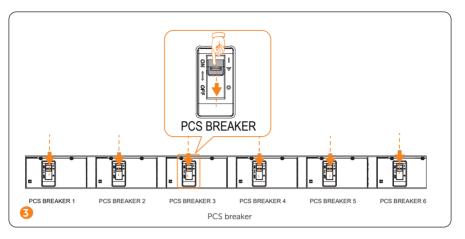
### **System Power-off**

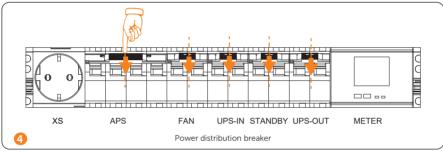
There are two circumstances: 1. Normal power off; 2. Emergency power off.

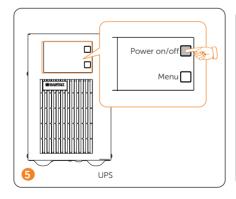
#### Normal Power Off

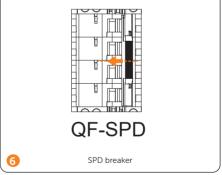


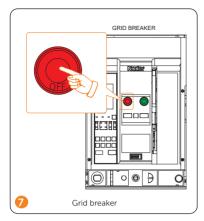


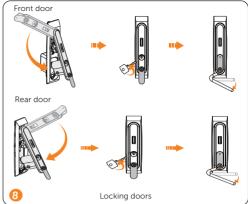








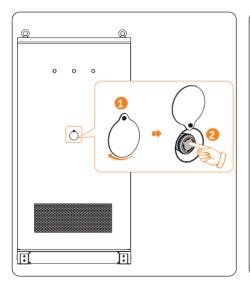




#### NOTICE

• Make sure you have locked the doors well after normally powering on the system.

#### **Emergency Power Off**





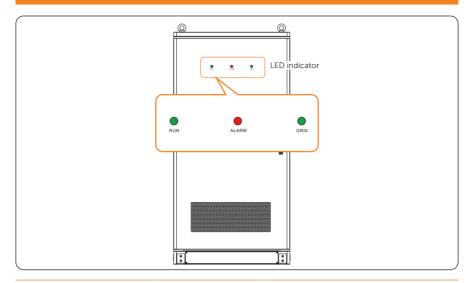
Do not press the emergency stop button unless in an emergency.

#### Note!

If the emergency stop button has ever been pressed down, it must be reset before you power the system next time. The resetting procedure is as follows:

- Rotate up the cover;
- 2. Rotate the button according to the arrow direction shown on the button, and then the button will spring back to its original position.

# **LED Indicators**



Indicator		Status	Description
Run	Solid green		Normal running
Alarm	Solid red		System exception
Grid	Solid green		On-gird running
Griu	Off		Off-grid running

Technical Data		
Model	X3-PCAB-750kW-A	
Rated AC voltage	3 / N / PE, 230 / 400 V	
Rated AC frequency	50 / 60 Hz	
Rated AC power	750 kW	
Max. AC power	825 kVA	
Max. AC current	1195.7 a. c A	
Rated short circuit current	40 kA	
Transfer between on/off grid	200 ms	
Power limit (Grid)	Yes	
PCS breaker	250 A × 6	
Grid breaker	1600 A	
Load breaker	1600 A	
SPD	Type II	
Ingress protection	IP55	
Operating ambient temperature range	-30 °C ~ 55°C	
Dimension (W x H x D)	1050 × 2100 × 1200 mm	
Relative humidity (RH)	0 to 95%	
Operating altitude	≤3000 m	
Weight	≤800 kg	
Communication	Ethernet/RS485/CAN/DI	
Certificates and approvals	IEC61439-1, IEC61439-2, IEC 61000, IEC 60730	

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# Warranty Registration Form



# For Customer (Compulsory)

Name	Country			
Phone Number	Email			
Address				
State	Zip Code			
Product Serial Number				
Installation Company Name				
Installer Name	Electrician License No.			
For Installer				
Module ( If Any )				
Module Brand				
Module Size(W)				
Number of String	Number of Panel Per String			
Battery ( If Any )				
Battery Type				
Brand				
Date of Delivery	Signature			

Please visit our warranty website:  $\frac{https://www.solaxcloud.com/\#/warranty}{https://www.solaxcloud.com/\#/warranty} \ or \ use \ your \ mobile \ phone \ to \ scan \ the \ QR \ code \ to \ complete \ the \ online \ warranty \ registration.$ 



For more detailed warranty terms, please visit SolaX official website: <u>www.solaxpower.com</u> to check it.



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