

Technical Manual

AEU160 Charging System

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In case of any doubt regarding a subject described or if you discover an error in this manual, please contact us.

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Abbreviations

AC	Alternating Current
DC	Direct Current
EVSE	Electric Vehicle Supply Equipment
EV	Electric Vehicle
CCS2	Combined Charging System (type 2)
CP	Control Pilot
OCPP	Open Charge Point Protocol
RFID	Radio Frequency Identification
UI	User Interface
LED	Light Emitting Diode
IMD	Insulation Monitoring Device
PDU	Power Distribution Unit
SPD	Surge Protective Device
MCCB	Molded Case Circuit Breaker
SECC	Supply Equipment Communication Controller
MCB	Miniature Circuit Breaker
RCBO	Residual Current Circuit Breaker with Overcurrent Protection Device
RCCB	Residual Current Circuit Breaker
PSU	Power Supply Unit
CMS	Cable Management System

1 Introduction

1.1 Function of this document

This manual only covers the charging system, a type of equipment that charges electric vehicles (EVs). This manual tells you how to safely:

- Install the electric vehicle supply equipment (EVSE).
- Set up the EVSE for the first time.
- Perform basic maintenance tasks.

1.2 Target user

This manual is for:

- **EVSE owners**: These are people who own and operate the EVSE for commercial or business purposes, or who may allow others to use it. EVSE owners are legally responsible for protecting users, other employees, and third parties while the EVSE is in operation.
- **Qualified engineers**: These are people who are fully familiar with the EVSE and are responsible for installing, operating, commissioning, and maintaining it. Qualified engineers should have knowledge of electrical safety, understand the principles and performance of chargers, and follow all local rules and instructions in this manual.

1.3 Version and revision history

The version of this document is V1.0.0 and the revision history is as follows.

Version	Date	Description
V 1.0.0	7th March 2025	Initial version

Table 1-1 Version of the technical manual

1.4 Disclaimer

- This manual was carefully reviewed by experts before it was published. It will be updated regularly to include any necessary changes or additions.
- The information in this manual is for informational purposes only.
- This manual, related manuals, and warnings do not replace your responsibility to use common sense when working with the EVSE.
- Acrel has done its best to make sure the manuals are accurate and up to date, but they are not responsible for any problems or damage that may come from using the information in them.
- Acrel is not responsible for any direct, indirect, special, or consequential damages (including loss of profits) that may come from any errors or omissions in this manual. All of Acrel's obligations are stated in the relevant contracts. Acrel reserves the right to change this manual from time to time.
- Any changes to the EVSE, including but not limited to user-specific modifications to the EVSE (such as placing stickers, SIM cards, or using different colors), hereinafter referred to as "Customization", may affect the final product's user experience, appearance, quality, and/or lifespan.
- Acrel is not responsible for any damage to or caused by the product "Customization" and is not responsible for any damages, losses, costs, or expenses resulting from the improper handling of the product.
- Contact your dealer for more information on "Customization" versus the default product.

1.5 Copyright

All rights reserved. The disclosure, duplication, distribution and editing of this document, or utilization and communication of the content are not permitted, unless authorized in writing. All rights, including rights created by patent grant or registration of a utility model or a design, are reserved.

1.6 Warranty

The warranty period is defined in your warranty policy. If you have purchased an extended warranty, the warranty period is defined in your purchase agreement.

The warranty only covers the product, and its parts delivered by Acrel. The warranty does not cover consumable parts such as cables and connectors, any other materials, labor, accommodation, or travel costs.

Changes or modifications to the equipment, unless specifically agreed upon with Acrel, will void the warranty.



- When you replace parts under warranty, keep the old parts until you know that Acrel does not need them for inspection.
- Installation, operation, commissioning, and maintenance tasks should only be done by the people described in Chapter 1.2. If someone who is not authorized to do these tasks does them, the warranty may be void.

1.7 Supplier

1.7.1 Europe

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Customer service hotline: +60 15 4600 0603

Global customer service E-mail: service.global@Acrel.com

Homepage: www.Acrel.com

2 Safety

The charging system from Acrel is only meant to be used for charging EVs. To use it safely and properly, it is important to follow the instructions in this manual and on the EVSE itself, as well as all local rules and regulations.

This EVSE has been developed, manufactured, inspected, and filed in accordance with all relevant safety standards. Therefore, if you can follow the instructions and safety tips for installation, commissioning, and maintenance, the EVSE will not cause property damage or harm your health under normal circumstances.

2.1 General safety

- Do not use the EVSE:
  - Near explosives or flammable substances.
  - In or near water.
  - If it is visibly damaged.
- Do not clean the EVSE with running water or a pressure washer.
- Do not change or modify the EVSE unless Acrel has approved it.
- Do not wrap the cables around the EVSE while charging.
- Do not place the connector on the ground. Place it in its holder after charging.
- Only do things that are described in this manual or the related manual, and that you are qualified to do.
- Follow the safety rules and accident prevention rules for the EVSE and for the area where it is used.
- Make sure the EVSE is used within the environmental conditions that are specified for it. For more information about environmental conditions, refer to Chapter 9.1.4.
- Only qualified electricians (Acrel certified partners) should install, operate, commission, and maintain the EVSE.
- All installation and wiring must be done when the AC cables are not energized. This means that the EVSE cannot be turned on during this process. This helps to prevent electrical accidents, short circuits, and electric shock hazards. It makes sure that the system is not turned on during risky procedures, which reduces the chance of fires during installation or maintenance.
- When handling electrical connections, always follow safety protocols, wear the necessary personal protective equipment (PPE), and use insulated tools.
- Follow the local rules and the instructions in this manual. If any requirements in this manual are not the same as the local rules, follow the local rules or the stricter of the two, as allowed by law.

2.2 Safety symbols

Symbols	Meanings
	**Electric hazard**: This symbol indicates that there is a danger of electric shock. Failure to pay attention to the procedures, practices or improper implementation may cause injuries or death.
	**Caution**: This symbol indicates that there is a hazard that could damage the product.
	**Warning:** This symbol calls attention to an act or condition which CAN lead to serious personal injury or death if not avoided.
	**Tips**: This symbol indicates that the information is helpful or provides useful advice. It does not contain any information about danger or harm.
	**Garbage disposal**: This symbol indicates that the electrical and electronic equipment and their accessories should be disposed of separately from household waste.
	**Grounding**: This symbol indicates ground protection. Once the ground fails or there is no grounding, the EVSE will report fault and stop charging.

Table 2-1 Safety symbols

2.3 Environmental conditions

You must use the EVSE in the environmental conditions that are specified for it. This is important for the EVSE to work properly and safely. For more information about environmental conditions, refer to Chapter 9.1.4.

2.4 Engineer requirements

2.4.1 Normal requirements

Engineers responsible for installation, operation, commissioning, and maintenance should:

- Be trained in safety and job skills and pass any corresponding assessments.
- Follow the local rules and the instructions in this manual. If any requirements in this manual are different from the local rules, follow the local rules or the stricter of the two, as required by law.
- Learn the electrical safety requirements and how to do first aid and emergency treatment for electric shock.
    - If there is a safety accident, immediately start the emergency plan and report it to the relevant person in charge. Also, provide first aid and emergency treatment according to the plan, control the spread of the issue, and rescue people and property.
    - If there is an electric shock, immediately shut off the power and assist the person using the approved emergency rescue method. At the same time, call for professional help, report to the relevant person in charge, and make a record.
- Strictly follow the operating procedures and job specifications when working to ensure safety and stability.
- Wear a uniform, insulated shoes and gloves, a safety helmet, and other protective gear if necessary. Also make sure there is a valid work permit if required,
- Be responsible for their work and fulfill their service commitments to the best of their abilities.
- Communicate with customers in a professional and courteous manner using clear and concise language.

2.4.2 Responsibility requirements

Engineers responsible for EVSE installation, operation, commissioning, and maintenance are accountable for:

- Making sure the EVSE is safe to use
- Improving the EVSE’s safety system
- Regularly checking the EVSE for safety issues
- Monitoring and reporting on the EVSE's safety status

2.4.3 Skill requirements

Engineers responsible for EVSE installation, operation, commissioning, and maintenance should:

- Understand how EVs and EVSEs work, how to troubleshoot common problems, how to maintain EVSEs, how to handle emergencies, and safety knowledge.
- Be familiar with the relevant national safety rules and regulations and understand charging safety and emergency procedures.

2.5 Safety guidelines for engineers

2.5.1 For installation engineers

- **Safety:**
  - Follow the safety rules of the construction site.
  - Wear a properly fastened safety helmet and make sure it is in good condition.
  - Do not wear unsafe clothing, such as loose clothes or slippers.
  - Do not go to work inebriated.
- **Working at heights:**
  - Always wear a safety helmet and ensure it is properly fastened, fasten your safety belt, and wear non-slip shoes.
  - Tie up your work tools.
  - Be careful when entering areas such as foundation pits, roofs, and openings to prevent accidental falls
- **Protective measures:**
  - If there is heavy dust at the construction site or painting work is being done, wear a protective mask.
  - Do not enter dangerous areas where materials are being lifted above you.
  - Do not strike objects.
  - Stay away from mechanical equipment and electrical circuits to prevent accidents.
- **When using portable power tools:**
  - Make sure you know how to use the tools safely.
  - Wear insulated shoes and gloves.
  - Make sure the tools are properly grounded.
- **Temporary electricity:**
  - Replace damaged electrical components immediately.
  - Temporary wires must be made of rubber cables, not plastic flexible cords.
  - Do not plug temporary wires directly into sockets.

  - Do not use temporary electrical components when they are live.
- **Ground conditions:**
  - Be careful of ground conditions with iron nails and steel bars.
  - This is to prevent injuries such as piercing, touching, hanging, and falling.
- **Site maintenance:**
  - Do not dismantle construction site protection facilities, safety signs, and warning signs without permission.
  - Maintain construction equipment in good condition.
  - This is to prevent malfunctions or overload operation.
- **EVSE usage:** Keep the door of the EVSE closed after installing it to prevent water intrusion from rain.

2.5.2 For commissioning and maintenance engineers

- **Safety:**
  - Follow the safety management rules of the construction site.
  - Wear a properly fastened safety helmet.
  - Do not wear unsafe clothing such as loose clothes or slippers.
  - Do not go to work if impaired.
- **Electrical safety knowledge:**
  - Know about electrical safety and how EVSEs work.
  - Know how to perform first aid and emergency treatment for electric shock. This will help you to identify and deal with potential emergencies before commissioning the EVSE.
- **Preparation before work:**
  - Before commissioning the EVSE, confirm the upper power supply point, power supply lines, and a safety emergency plan are all in place.
  - Make sure there are at least two carbon dioxide fire extinguishers on site.

- **Protective measures:**
  - Assume that all electrical equipment and lines are live and do not touch them before checking the power. If you need to touch them, turn off the power and check them again. Put the proper LOTO (Lock Out Tag Out) sign on the power switch handle and ensure it has been locked out to prevent someone from accidentally turning the power on.
  - If possible, turn off the power before working. If you need to work with the power on, ensure someone can monitor you. The monitor must be trained as well and focus on monitoring.
  - When working on live equipment, first identify the L, N, and PE lines and choose a safe working position. When working, do not touch anything conductive and ground at the same time.
  - Do not change the original wiring and structure of the charger without permission and approval.
  - After the work has been completed, restore the charger to its original state. Check for tools to prevent leaving something behind and clean and organize the site.
- **In case of a safety issue:**
  - Immediately turn off the power at the upper power supply point and refer to the emergency safety plan.
  - Report the issue to the person in charge immediately as required.
  - Conduct on-site emergency treatment in accordance with the emergency plan.
  - Control the seriousness of the incident and assist personnel and protect property.
  - If there is an electric shock, immediately cut off the upper power and provide assistance.
  - At the same time call for emergency response assistance and report the incident to the supervisor.
  - Be sure to keep a record.



- Only Acrel personnel or people who have been authorized, certified, and trained by Acrel or other qualified personnel can commission DC chargers. Acrel will not be responsible for any losses caused by third-party personnel commissioning chargers without Acrel's authorization.
- Commissioning must be done carefully according to the procedures. If any operation cannot be completed, it must be stopped until the cause is found and fixed. Commissioning should not be done in severe weather conditions such as rain, snow, or sandstorms.

2.6 Fire safety guidelines for construction sites

- **Flammable and explosive materials**:
  - Do not store flammable or explosive materials at the construction site.
  - Set up proper storage areas for these materials to prevent accidents.
- **Fire extinguishers**:

  The construction site must have at least two fire extinguishers to respond to any possible fire hazard. We recommend carbon dioxide fire extinguishers.
- **Placement of fire extinguishers**:
  - Place fire extinguishers in a location that is easy to see and access.
  - Make sure they do not block any evacuation routes.
  - This ensures that they can be quickly and safely accessed in an emergency.

2.7 Fire emergency response plans

2.7.1 Initiation of the plan

If a fire happens, notify the emergency services immediately. Everyone must follow the orders of the emergency response team to help rescue people and clean up any damage.

2.7.2 Contingency procedures

- **If you see a fire accident:**
  - Stop charging immediately. If the fire is in the charging station, stop the charging process to prevent the fire from getting worse.
  - Call the fire department. Call the fire department right away and tell them where the fire is.
  - Evacuate safely. Get away from the fire quickly and stay away from it.
  - Use a fire extinguisher (if possible). If the fire is small, you can use a fire extinguisher to put it out. But make sure you use the right type of fire extinguisher.
- **If there is a fire:**
  - Tell your supervisor right away.
  - If the fire is small and you can control it, use a fire extinguisher to put it out. While you are doing this, tell people at all levels about the fire.
  - Have at least two people fight the fire. Stand upwind, crosswind, or in a safe position.
  - If you cannot control the fire, have everyone in the area evacuate immediately.
  - If the fire gets bigger, the person in charge must evacuate everyone immediately.
  - Tell employees in the affected area to go to the assembly point along the designated route. Follow the instructions of the person in charge of the company.

- The emergency response team (ERT) will organize rescue efforts according to the fire.
- If you cannot control the fire, report it to emergency services in time for support. Cooperate with the fire fighters for rescue efforts.
- Collect information about what happened before the fire, what the monitoring system showed, and what witnesses saw. This will help you to understand what caused the accident. You will need to share this information with the owner and the site.
- Give the local fire department the information they need to investigate the cause of the fire.

2.7.3 Concluding fire emergency response

When the emergency crews have finished their work, the people in charge of emergencies will announce that the danger is over, and the emergency is lifted. Then, everyone can go back to their normal work.

2.7.4 Fire prevention tips for end users

To prevent fires at the charging station:

- **Follow the instructions:** Read and follow the user manual or instructions that came with your EV and the charging station. For more information on how to safely connect and disconnect your EV to the charging station, refer to Chapter 4 of the corresponding user manual.
- **Inspect the equipment before use**: Before you plug in your EV, check the charging cable, connectors, and the charging station itself for any signs of damage, fraying, or loose connections. If you see any problems, don't use the charging station and tell the owner of the station or the charging station manufacturer.
- **Use compatible charging equipment:** Make sure that the charging cable and connector you use are compatible with your EV model. Using the wrong charger can increase the risk of overheating or electrical malfunctions.
- **Avoid charging in extreme weather conditions:** Extreme temperatures, such as very hot or very cold weather, can affect the charging process and potentially lead to fire hazards. If possible, avoid charging in severe weather conditions. For more information on environmental parameters, refer to Chapter 9.1.4 of this technical manual.
- **Keep the charging area clear:** Make sure the charging area is free of flammable materials, liquids, or obstructions. Keep a safe distance from other vehicles or objects to prevent any accidental collisions or damage.
- **Never leave the charger unattended:** While it may be tempting to leave your EV charging unattended, it is important to stay nearby and keep an eye on the charging process. In case of any problems, you can take immediate action.
- **Regularly inspect and maintain your EV:** Proper maintenance of your EV is crucial for preventing potential fire risks. Regularly check the battery, electrical system, and overall condition of the vehicle as recommended by the manufacturer.
- **Be cautious with third-party accessories:** If you use third-party charging accessories, such as adapters or extension cords, make sure they are certified for EV charging and meet the necessary safety standards. Faulty accessories can pose a fire risk.
- **Report any abnormalities:** If you notice any unusual behavior or experience difficulties during the charging process, such as sparks, smoke, or unusual sounds, immediately stop charging and report the issue to the owner of the station or the charging station manufacturer.

- **Be prepared for emergencies:** Familiarize yourself with the location of fire extinguishers and emergency shutdown procedures at the charging station. Keep a fire extinguisher handy and know how to use it effectively.
- **Stay informed about safety updates:** Stay up to date on safety guidelines and recommendations related to electric vehicle charging. Follow any safety alerts or recalls issued by the charging station manufacturer or relevant authorities.

2.8 Disposal

In accordance with the European Directive 2012/19/EU, Waste Electrical and Electronic Equipment (WEEE) and its implementation in national law, the electrical devices including chargepoints which are used must be collected separately and recycled in an environmentally responsible manner. We recommend that you return your used device to your dealer or obtain information regarding a local, authorized collection and disposal system. Failure to comply with this EU Directive may result in a negative impact on the environment.

2.9 Emergency stop

When you press the emergency stop, the screen will show a warning message that says, "Emergency Stop" and the LED status indicator will turn red.



- After you press the emergency stop, the EVSE will not work properly. Call our customer service number to address the issue.
- Once the problem is resolved, a professional should reset the emergency stop.

3 Product overview

The charging system is a DC integral charging system that can be used to charge EVs indoors and outdoors.

3.1 Nameplate

The following picture shows the nameplate for the EVSE. The nameplate is located on the corresponding devices.

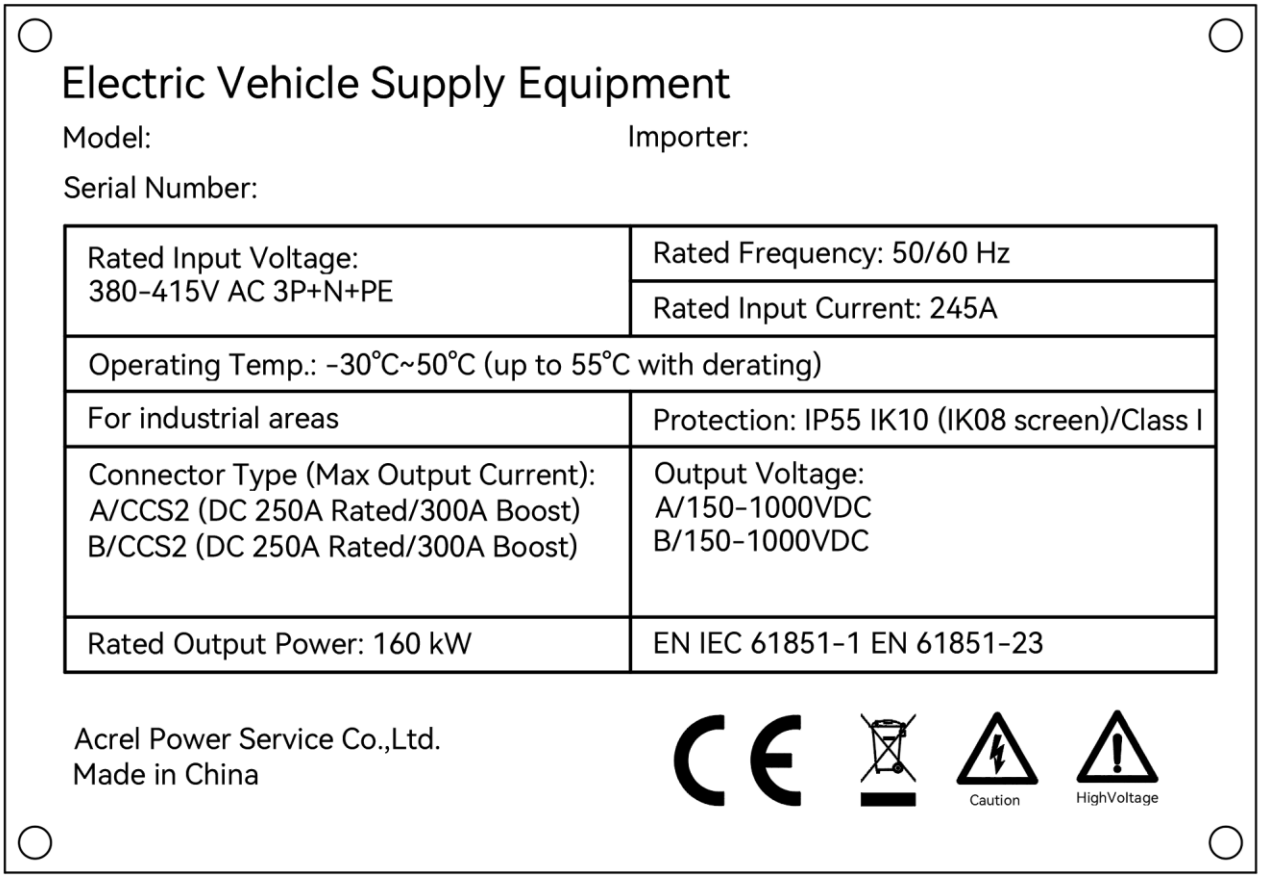


Figure 3-1 Example of the nameplate with 2×CCS2 connectors

3.2 External view

The picture below is for reference only, please refer to the actual products.

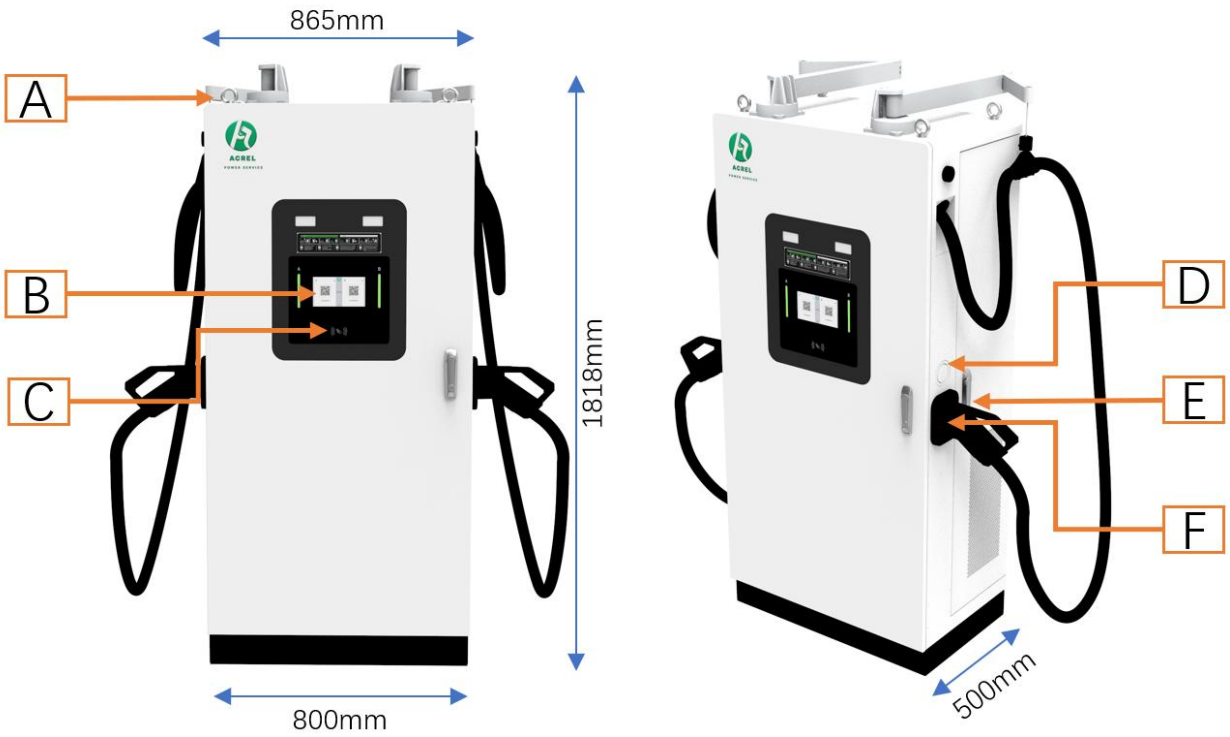


Figure 3-2 External view

A	Cable management system (CMS)	D	Emergency stop
B	7-inch touch screen	E	Lock
C	RFID reader	F	Charging connector holder

Part	Name	Description
A	Cable management system (CMS)	To protect the charging cables from damage and ensure that they are properly stored.
B	7-inch touch screen	To control and monitor the charging process.
C	RFID reader	To read the information from an RFID card to start or stop the charging process.
D	Emergency stop	To immediately stop all operations and power supply to the EV in an emergency. (For more information, refer to Chapter 2.9.)
E	Lock	To open and lock the door of the EVSE.
F	Charging connector holder	To safely store the charging connector when it is not in use.

Table 3-1 External component functions

3.3 Internal view

The picture below is for reference only, please refer to the actual products.

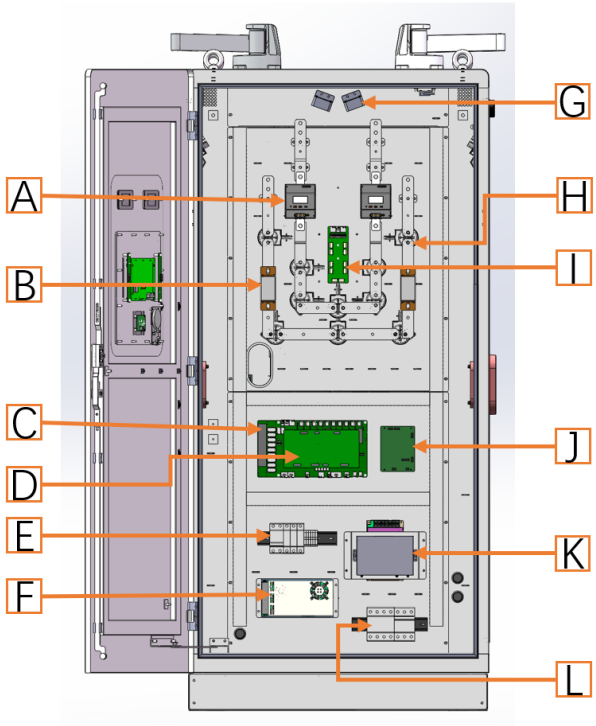


Figure 3-3 Internal view #1

A	DC Meter	H	DC contactor
B	Fuse	I	Adapter Board
C	Main Control Board	J	SECC Board
D	Auxiliary Control Board	K	Router
E	RCBO	L	SPD
F	Power Supply Unit		
G	Mini DC fan		

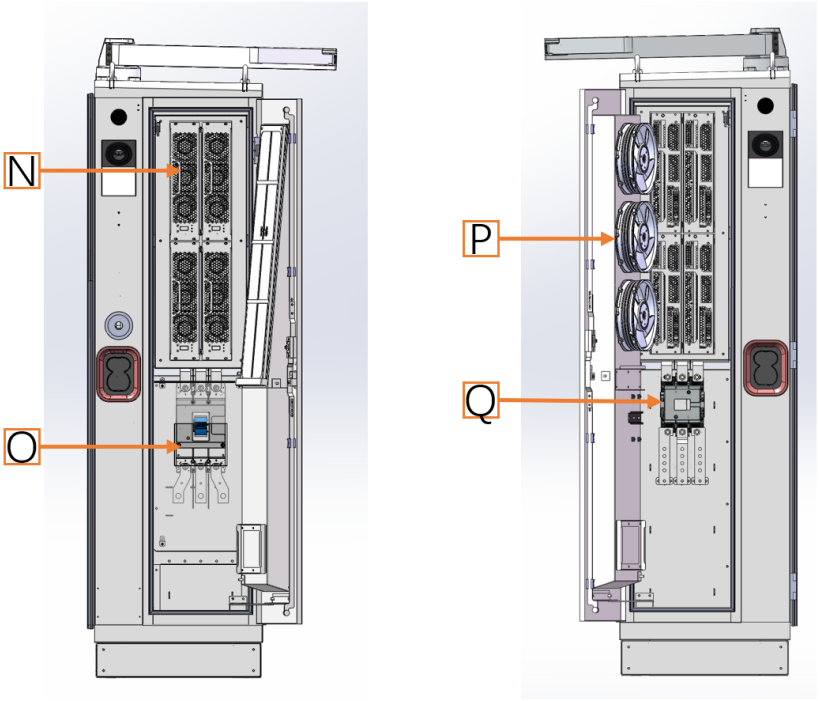


Figure 3-4 Internal view #2

N	Power module	P	DC fan
O	MCCB	Q	AC contactor

Part	Component	Description
A	DC Meter	To measure the cumulative amount of power used.
B	Fuse	To break a circuit when the current is abnormal.
C	Main Control Board	To control the charging process, communicate with the platform, and process order information.
D	Auxiliary Control Board	To execute the charging process, obtain data from the energy meter, monitor the temperature of the charging connector, and so on.
E	RCBO	To protect the EVSE from excessive current and prevent electrical hazards.
F	Power Supply Unit	To power the 12&24V devices in the charging.
G	Mini DC fan	To improve air circulation and dissipate heat.
H	DC contactor	Turn off and on the circuit where the contactor is.

I	Adapter Board	Transmit control signals of the electricity meter and the contactor.
J	SECC Board	Protocol communication with EV.
K	Router	To provide extra net or special public network connection to link the EVSE to the platform and establish bidirectional data transmission between them.
L	SPD	To quickly divert excessive current and protect the EVSE when there is overvoltage in the circuit.
N	Power module	To convert AC power from the grid to DC power for charging the battery of an EV.
O	MCCB	To protect the circuit from overloading, short circuit, and current surges.
P	DC fan	To improve air circulation and dissipate heat.
Q	AC contactor	To control the flow of AC power.

Table 3-2 Internal component functions of the EVSE

3.4 Charging connector type

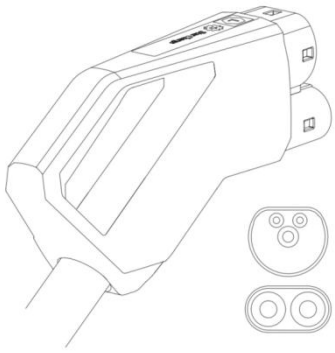
	Acrel can deliver the EVSE with combined charging system 2 (CCS2) connectors on the charging cables. The length of the charging cable outside of this EVSE is 7 m (optional).

Table 3-3 Charging connector type

3.5 Status of the LED indicator

Lightening effects	LED status indicator	Meaning
	Steady green	Available
	Green flashing	RFID card detected
	Steady yellow	Warning only, can charge normally
	Steady blue	Charging

	Steady red	Fault

Table 3-4 Status of the LED indicator

4 Transport, storage, and unpacking

4.1 Transport to the site

A transportation company is responsible for delivering the charging system to the site and moving it to the designated location.

You are not allowed to transport or handle the EVSE unless you have proper authorization and follow these safety measures.

Safety measures for handling EVSE equipment:

- Check the weight of the EVSE on the Unpacking list. Make sure that the offloading equipment you use can safely handle this weight.
- Check that the pallet is not damaged. If the pallet is damaged, contact the site manager for instructions on how to safely unload and move the EVSE.
- Check that the work area is safe before handling the load (e.g., there should be no obstacles in the unloading area, the flooring should be suitable, and there should be a safe path).
- Make sure that the forklift or hoisting equipment you use for loading/unloading is suitable and can move the EVSE safely. Also, check that the forks of the forklift can fully enter the pallet to support the EVSE. Forklift operators must follow all local regulations.
- Make sure that the area is not accessible to unauthorized personnel and that the personnel involved in handling the equipment are fully aware of the safety measures to be applied when handling the equipment. They should also stay a safe distance from moving equipment.
- All personnel involved in handling must wear the necessary personal protective equipment (PPE) and follow all relevant safety measures for the work area.

4.2 Store the equipment

If you need to store the EVSE before installing it, refer to Chapter 9.1.4 for the environmental specifications.

4.3 Unpacking inspection

It is best to transport the EVSE in its original packaging and only unpack it when you reach your destination. Once the EVSE arrives, the installation personnel shall do the following steps in the presence of the owner:

- Remove the packaging material.
- Discard the packaging material (refer to Chapter 2.8) or keep the packaging material for future use.
- Carry out the unpacking inspection and meticulously fill in the unpacking record in Appendix 1.
- If any problems are found in the process of unpacking and acceptance, make records and wait for the negotiation between the owner and the supplier.

4.3.1 Unpacking list

Packaging Specification

Item	Specification
Packing material	Wooden box
Configuration	Standard
Packaging size	1985×910×820mm (H×W×D)
Packaging weight	280kg

Package Content

No.	Item	QTY.
1	DC Charger	1
2	Document	1
3	Key	3
4	IC card	2

Table 4-1 Unpacking list for EVSE

4.3.2 Inspection of unpacking

Unpacking inspection steps:

- Check the number of items on the unpacking list and make sure that all of the equipment is present.
- Check the information on the equipment nameplate to make sure that the product information is correct, and the nameplate is clean and intact.
- Check whether the attached documents are complete.
- Check whether the spare parts and accessories are complete.
- Check the delivery inspection report and certificate to make sure that they are present.
- Check the appearance of the equipment to make sure that there are no dents, bumps, stains, or other damage.
- Check whether the charging cable on the EVSE is securely attached.

5 Installation

5.1 Prerequisites

Before you start installing the charging system:

- Make sure you have read and understood all of the all of the safety instructions (refer to Chapter 2).
- Unpack the EVSE (refer to Chapter 4.3).
- Review the current and distribution capacity specifications (refer to Chapter 9.1.2).
- Check the installation environment (refer to Chapter 9.1.4).
- Follow the regulations in your country to install and connect the equipment.
- Make sure that there is no voltage on the AC cables connected to the EVSE during the installation process.
- Do the installation check to make sure that the EVSE is ready to be installed (refer to Appendix 2).

5.2 Site preparation

Before installing the charging system, you must make sure that there is enough space between the EVSE and the surrounding obstacles, and between the EVSE and the EV. This is to ensure proper airflow and to allow for any necessary service or maintenance work.

5.2.1 Space requirements between EVSE and obstacles

If the back or side of the EVSE you are installing is near a wall or other obstacle, you must leave enough space for maintenance.

Unit: mm

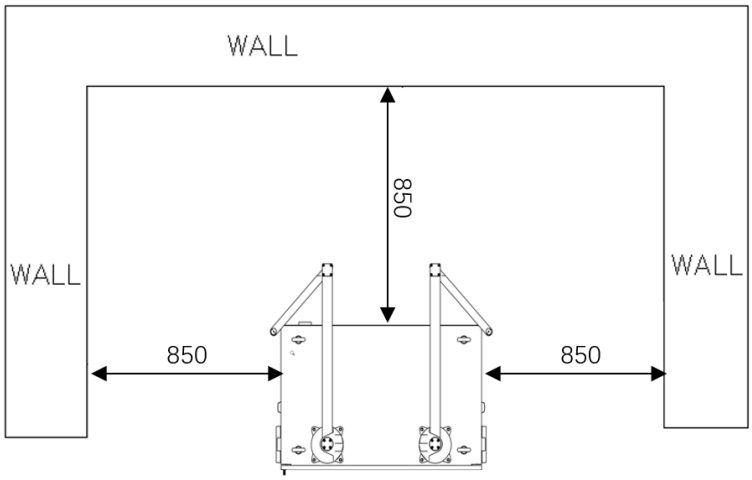


Figure 5-1 Schematic diagram of maintenance distance for the EVSE

5.2.2 Space requirements for parking spaces

If the EVSE is installed in the middle of a parking space or a back-to-back parking space, it is recommended to allow 1200 mm of space between the wheel stopper and the EVSE to facilitate the charger usage.

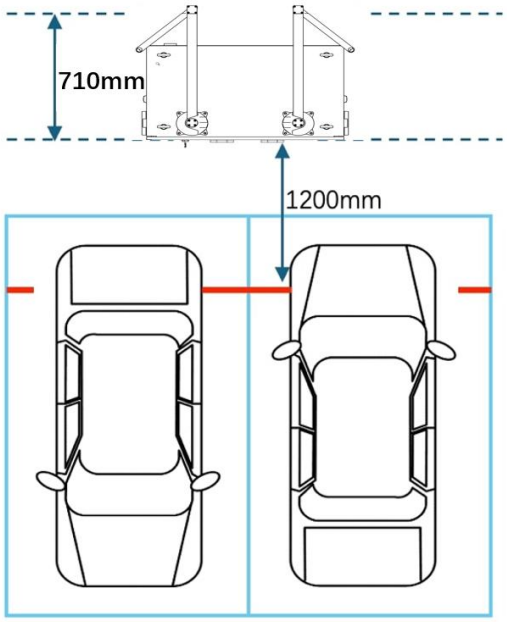


Figure 5-2 Schematic diagram of the parking space requirement

5.2.3 Airflow requirements

It is important to make sure that the equipment has enough air to circulate around it and that the air inlet and outlet are not blocked. If the air cannot circulate properly, the internal components will not be able to stay cool enough, and the EVSE will not work as well as they should.

5.2.4 Canopy requirements

The installation of canopies at the charging station must comprehensively consider structural safety, environmental adaptability, and user experience. Compliance with relevant international and local standards and regulations is required.

Note: it is recommended to construct a canopy for the EVSE. The requirements below are for reference only. The specific standards may vary depending on your local regulations.

5.2.4.1 General structural standards

- Consider wind loads, snow loads, and seismic requirements based on the station's location to ensure structural stability.
- The canopy size must align with vehicle movement requirements, meeting minimum clearance height standards (typically above 4.5 meters, can be adjusted based on operator's usage requirements).
- The reference standards are as follows:
  - **ISO 3010**: Principles for seismic design of buildings.
  - **EN 1991 (Eurocode 1)**: Structural load standards, including snow, wind, and seismic loads.
  - **EN 1993 (Eurocode 3)**: Steel structure design standards.
  - **EN 1999 (Eurocode 9)**: Aluminum structure design standards.
  - **ASCE 7**: Minimum design loads for buildings and other structures, including wind, snow, and seismic considerations.

5.2.4.2 Environmental and durability standards

- Canopy materials should be high-strength, corrosion-resistant, and UV-resistant to ensure longevity.
- Use environmentally friendly materials to minimize ecological impact.
- Material Performance and Environmental Adaptability:
  - **ISO 12944**: Corrosion protection of coating systems for outdoor metal structures.
  - **ISO 9223**: Classification and design standards for atmospheric corrosion resistance.
  - **ISO 14001**: Environmental management systems.
  - **ASTM G154**: UV aging tests to assess material durability.

5.2.4.3 Fire safety and emergency evacuation

- Construct canopies using fire-resistant materials, especially for covered areas.
- Provide clear emergency evacuation signs, particularly in large stations.
- The reference standards are as follows:
  - **ISO 834**: Fire resistance tests for building components.
  - **NFPA 5000**: Building construction and safety code.
  - **EN 13501**: Fire classification for building materials and components.

5.2.4.4 User experience and accessibility design

- Provide adequate lighting (e.g., LED lights) to meet safety and operational needs at night.
- Canopy design should consider pedestrian and vehicle flow to avoid congestion or interference.
- The reference standards are as follows:
  - **ISO 2575**: Standards for road vehicle symbols and information, applicable to charging station signage.
  - **EN 81-70**: Accessibility design to ensure safe use by wheelchair users.
  - **ADA (Americans with Disabilities Act)**: Accessibility Guidelines for Buildings and Facilities.

5.3 Cable preparation

Once the installation site is ready, check the cables according to the following cable checklist, and gather the necessary materials, such as cable terminals.

5.3.1 Cable checklist

The recommended type of the incoming cable is 0.6/1kV-3×120mm² +1×60mm² +1×60mm² (copper core). The cable over the concrete foundation surface should be approximately 1 meter in length. The cable type mentioned in this manual is only a suggestion. The installation personnel remain the responsible for determining the correct cable and compliance with applicable standards and regulations.

No.	Cable type	Quantity	Remark
1	Copper core cable 0.6/1kV-3×120mm²	1	L1+L2+L3
2	Copper core cable 0.6/1kV-1×60mm²	1	N
3	Copper core cable 0.6/1kV-1×60mm²	1	PE
4	Shielded CAT6 cable	1	Network cable

5.3.2 Construction materials preparation

Prepare the following construction materials:

- Cable terminal
  - 120mm^2 cable corresponding terminal: DT-120 copper terminal.
  - 60mm^2 cable corresponding terminal: DT-60 copper terminal.
  - RJ45 connector for Shielded CAT6 network cable (If network communication is required).
- Materials needed for fireproofing and sealing
  - Fire-proof mud.
  - Heat-shrinkable tubes.
  - Insulating tape for cables.

5.4 Foundation preparation

If you cannot find a suitable place to install the pole mounted EVSE, you can build a concrete foundation. You need to pour the concrete foundation before installing the EVSE.

The size of the concrete foundation is 1000mm×700mm×600mm with a burial depth of 400mm, exceeding ground level by 200 mm. You can adjust the design based on your needs and the actual conditions on site.

5.4.1 Safety instructions for foundation

- The relevant electrical codes and standards should be followed when building the foundation. Specifications such as NEC or IEC provide guidelines for safety devices and protection against electric shocks.
- The concrete foundation should be located in a suitable position with the proper soil type and good drainage to avoid water seepage and potential electrical grounding issues.
- Grounding and bonding should be performed for the concrete foundation to prevent electrical hazards.
- Regular inspection and maintenance of the concrete foundation should be carried out to ensure continuous electrical safety. Any signs of wear, damage, or deterioration should be promptly addressed.

5.4.2 Foundation preparation guide

Here are some things to keep in mind when preparing a concrete foundation:

- Make sure the foundation is level with the ground.
- Leave enough space for maintenance.
- Embed 4×M10 screws with length 250 mm in the concrete foundation to secure the EVSE to the foundation, and the M10 anchor bolts should be exposed to the upper surface of the foundation by 30 to 40mm.
- Use concrete with a strength grade of C20 or higher.
- Leave holes in the foundation for the cables.
- Make sure the location and materials of the foundation meet the requirements of the specifications and the actual conditions on site.
- Once the foundation is complete, use a spirit level to make sure it is level.

The diagrams below show the different views of the concrete foundation for the EVSE.

Unit: mm

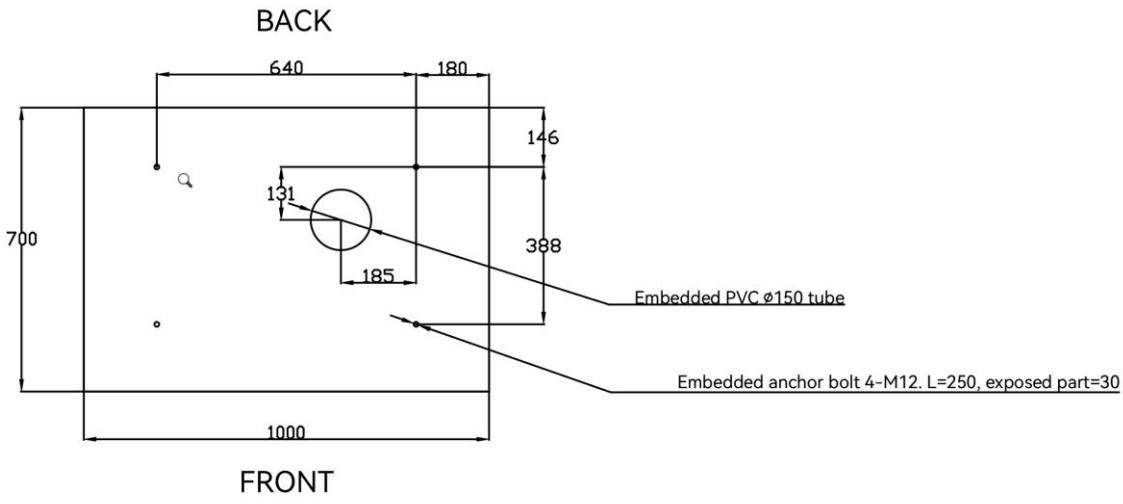


Figure 5-3 The top view of the foundation

Unit: mm

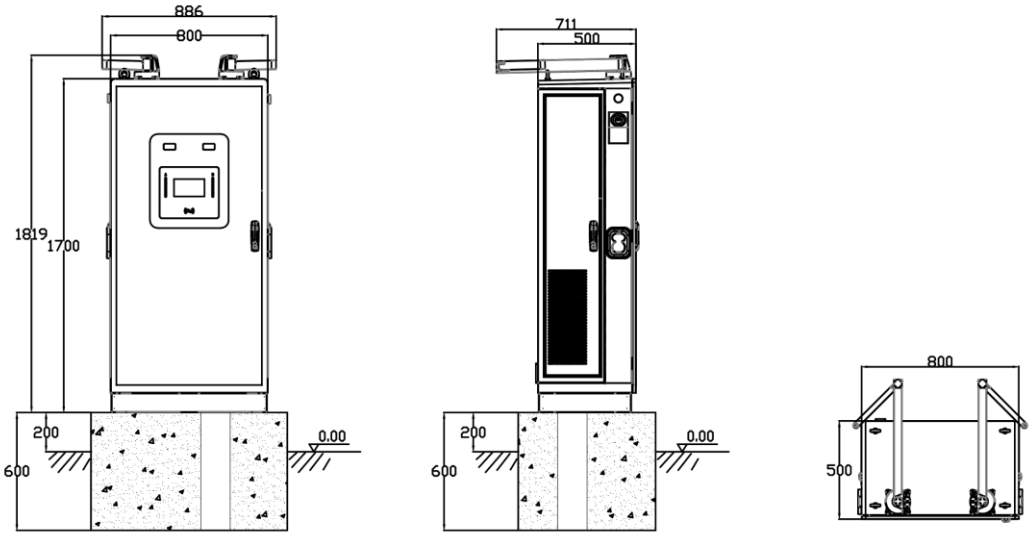


Figure 5-4 The front, left and top view of the EVSE with the foundation

5.5 Current and distribution capacity requirements

The power grid can be a TN or TT system. The phase-to-phase voltage should be 400V (±15%) with a frequency of 50~60Hz. If the EVSE is operating at the full power, the grid capacity should meet 300kVA, with a rated input current of 245A for the EVSE. It is suggested to use an MCCB with Ue: 400Vac, In: 400A, thermomagnetic type, Icu ≥ 100kA, Ics ≥ 70kA, 3P.

5.6 Grounding/insulation resistance check

- Verify that the grounding resistance test report confirms that the grounding grid's resistance created on-site is compliant with local regulations.
- Verify that the insulation resistance test report confirms that the cable's insulation resistance is ≥1MΩ.

The requirements above are the minimum requirements for installing an EVSE. The specific standards may vary depending on your local regulations.

5.7 Mechanical installation

(1) Remove the front, rear, and side sealing plates of the base of the EVSE using a Phillips screwdriver.

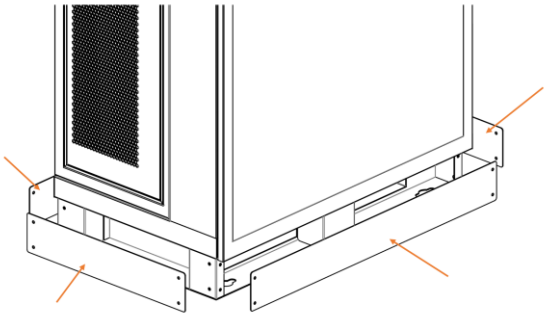
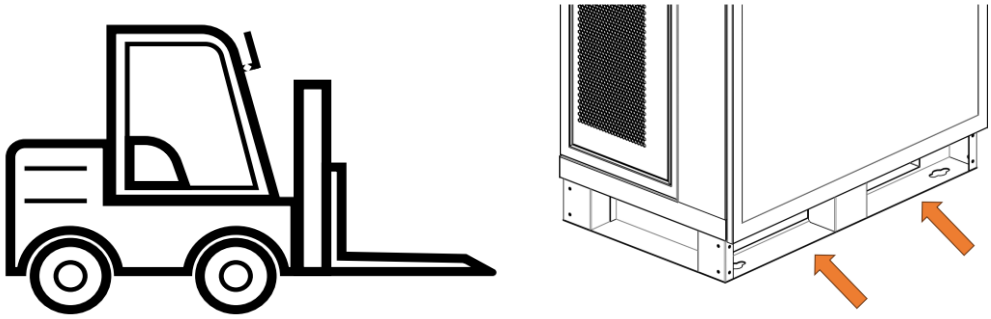


Figure 5-5 Remove the sealing plates

(2) Use a forklift or crane to lift the EVSE into installation position.

Transport by forklift:

1) Insert the fork into the base of the EVSE.
2) Lift the EVSE into the installation position.
3) Place the EVSE on the concrete foundation, ensuring that the four holes are aligned with the corresponding holes.



Insert the fork

Figure 5-6 Insert the fork into the base of the EVSE

Transport by crane:

1) Select the appropriate crane and lifting sling according to the weight of EVSE.
2) Fix the lift sling to the eyebolt on the top of EVSE.

WARNING

The height of the lifting sling from the eyebolts to the hook must be at least 1m.

3) Lift the EVSE into the installation position.

WARNING

- The force center of the hook should be located at the symmetrical force center.
- Lift the EVSE according to the lifting operation specification.

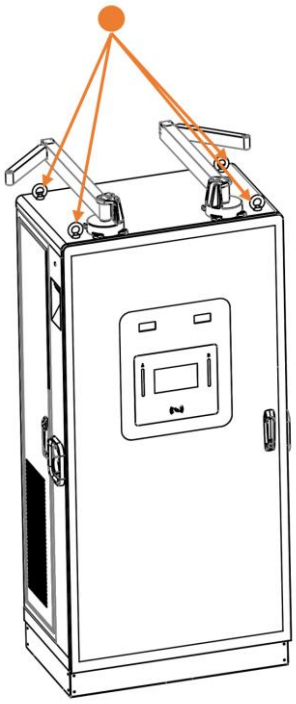


Figure 5-7 Lift up the EVSE

4) Install nuts and washers onto the anchor bolts to secure the EVSE.
5) Reinstall the sealing plates of the base of the EVSE.

5.8 Electrical installation

5.8.1 Electrical schematic diagram

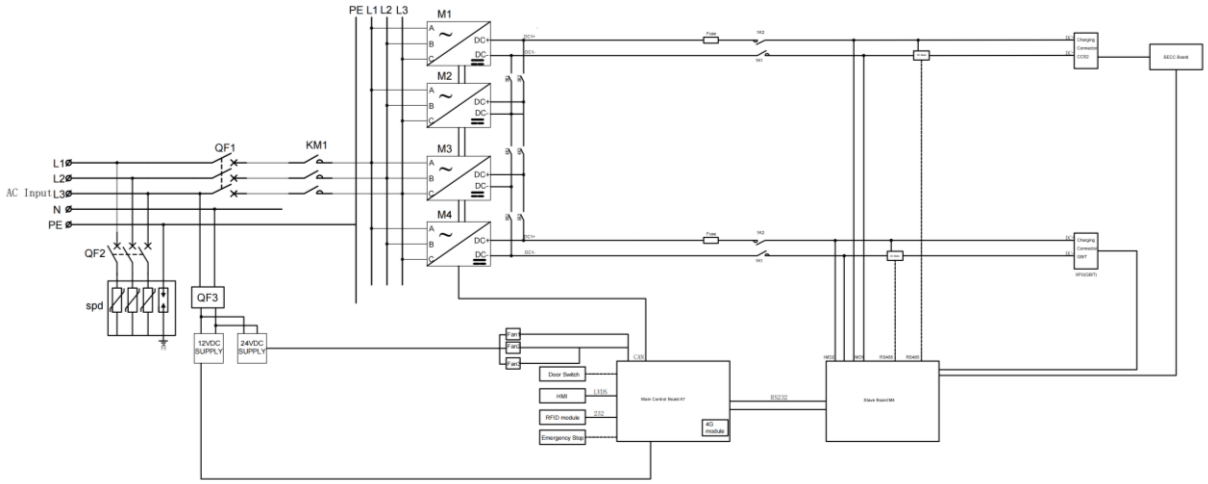


Figure 5-8 Electric schematic of the EVSE

5.8.2 Cable wiring

(1) Open the right door of the EVSE and remove the incoming plate.

(2) Pass the power cables through the hole on the bottom of the EVSE.

(3) Strip the cable end.

(4) Crimp the cable end to the copper lugs.

(5) Secure the copper lugs to corresponding terminals by bolts.



- Make sure the bolts are not loose.
- Do not scratch or damage the cable insulation sheath to prevent short circuits.

(6) Install the incoming plate, then close the right door of the EVSE.

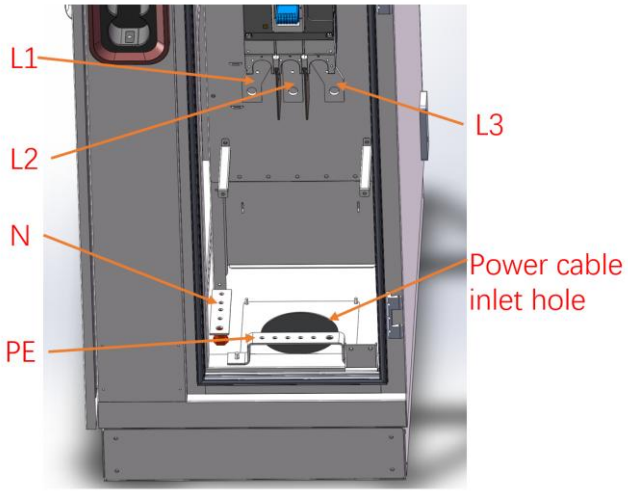


Figure 5-9 Wire the power cables

5.8.3 Network cable wiring (optional)

(1) Open the right door of the EVSE.

(2) Pass the network cable through the cable inlet at the bottom of the EVSE.

(3) Connect the network cable end to the Ethernet port on the mainboard.

Note: Refer to the figure below to find the Ethernet port.



Figure 5-10 Network cable connection

5.8.4 Charging cable fixation

(1) Open the package of the charging cable and the clamp is already attached to the charging cable.

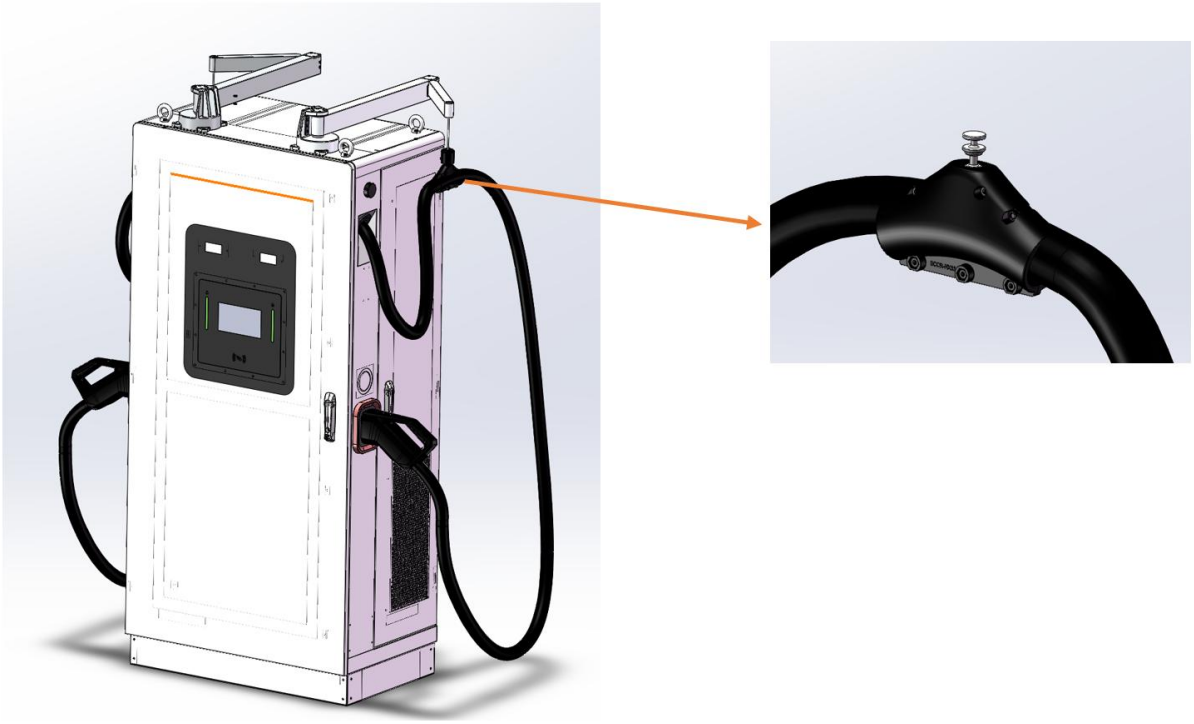


Figure 5-11 Position of the charging cable clamp

(2) Insert the axis of the clamp into the hole of CMS.

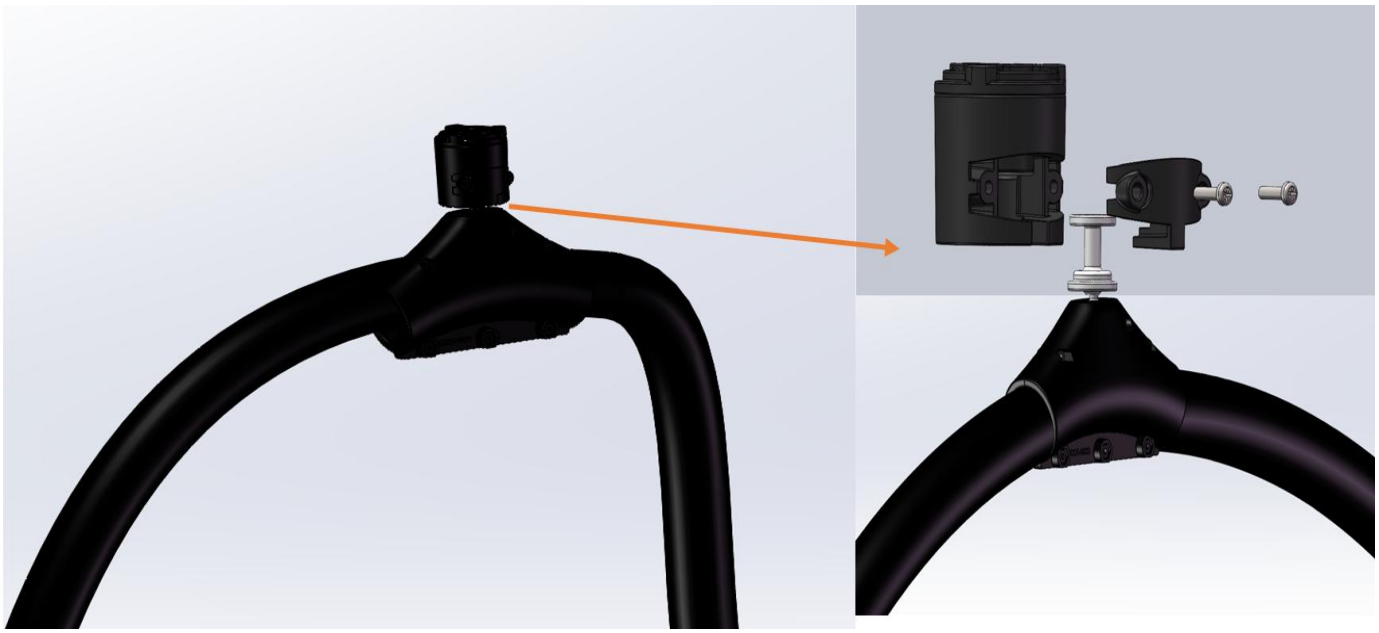


Figure 5-12 Insert the clamp axis to CMS

5.9 Sealing up

(1) Clean the stains and sundries on the cable entry of the EVSE.

(2) Make sure the cable glands are securely tightened to maintain their sealing performance and prevent moisture from entering.

5.10 Check after installation

5.10.1 Installation and wiring check

Before the EVSE is turned on, only qualified engineers should inspect it. This section describes what to look for when inspecting the EVSE and its mounting:

- The EVSE should be clean and tidy, without any dents or damage. It should also be firmly attached to the base and not wobbly.
- The EVSE should be installed in the correct orientation, and all parts should be present. The installation should also be level.
- The cables should be laid and connected correctly.
- The insulation on the cables should not be scratched or damaged.
- The power cable terminals should be tight.
- There should be no hanging cables, and the bending radius of the cables should meet the requirements.
- The ground wire should be connected to the grounding grid for the device.

5.10.2 Check before power on the EVSE

- **Short circuit check:** Make sure there is no short circuit between the three phase wires, the neutral wire, and the ground wire in the EVSE of the low-voltage distribution cabinet that is connected to the EVSE.
- **Power voltage check:** Make sure the power voltage at the top of the MCCB in the low-voltage distribution cabinet is normal. There should be no problems such as missing phases, overvoltage, undervoltage, or incorrect phase sequence.

5.10.3 Check on power-on

The EVSE can only be turned on after all the wiring is complete and correct. Here are the steps to turn on the EVSE:

(1) Close all MCCBs in the upstream power distribution cabinet.

(2) Measure whether the voltage of the output terminal of the MCCBs in the power distribution cabinet is 400 Vac (±15%).

(3) Measure whether the voltage of the inlet AC copper busbars in the EVSE are approximately 400 Vac (±15%).

(4) If the above conditions are met, power on the EVSE.

5.11 Completion information

Number	Name	Number of pages	Document Necessity
1	Unpacking record sheet	1	Required
2	Pre-installation checklist	1	Required
3	Post-installation checklist	1	Required

Table 5-1 Completion information

5.12 Appendix

Appendix 1 Unpacking Record Sheet

Unpacking Record Sheet					
Name of owner			**Unpacking date**		
NO.	**Case**	**Name of goods**	**Quantity**	**Acceptance**	**Notes**
Unpacking conclusion					
Signature block	**Installation unit**			**Owner unit**	

Appendix 2 Pre-installation Checklist

Pre-installation Checklist				
Project name:				
Civil construction unit:		**Equipment installation unit:**		
Sub-project	**SN**	**Main acceptance items**	**Acceptance record**	**Treatment measures**
Installation plan	1	Whether the on-site equipment installation plan complies with the construction plan design drawings.		
Power distribution cabinet MCCB	1	Meet the input requirements in Chapter 5.6.		
Maintenance distance	1	The maintenance distance meets the equipment spacing requirements in Chapter 5.3.		
Cable type	1	The cable meets the requirements in Chapter 5.4.		
Concrete foundation	1	The concrete foundation meets the requirements in Chapter 5.5.		
In conclusion:				
Note: (1) In the acceptance record, fill in "√" or "×" according to the on-site situation; (2) At the conclusion, fill in "qualified" or "need to rectify" according to the on-site situation				
Signature of person in charge of inspection: _____ Date:				

Appendix 3 Post-installation Checklist

Post-installation Checklist			
No.	**Checking items**	**Checking result (Y/N)**	**Note**
1	Installation levelness is qualified		
2	The appearance is clean and tidy without bumps or damages		
3	All the parts /screws/bolts are fixed firmly without looseness and no parts missing		
4	No insulating layer of cable is scratched or damaged		
5	The phase sequence of the power cable wiring is correct		
6	The wiring terminals and screws are tightened without looseness		
7	The upstream main circuit breakers (MCCBs) meets the requirements		
8	No abnormality in the upstream power grid voltage		

6 Commissioning

6.1 Prerequisites

Before you start commissioning the charging system:

- Make sure you have read and understood all of the safety instructions (refer to Chapter 2).
- Follow each step carefully while wearing the right safety gear, such as insulated shoes and gloves.
- Refer to Chapter 9.2.3 for the torque of all components.



- Only qualified engineers should commission the EVSE, in accordance with local laws and regulations. Acrel is not responsible for any losses caused by unauthorized commissioning by third-party personnel.
- Commissioning must be done carefully following the procedures. If any operation cannot be completed, stop until the cause is found and fixed.
- Do not commission the EVSE in severe weather conditions such as rain, snow, or sandstorms.
- During commissioning, the engineer must not leave the site while the door is open. The engineer must warn other people of the danger and prevent third parties from being curious and accidentally getting electrocuted. When leaving the site, make sure that all charger doors are closed and locked.

6.2 Commissioning flowchart

The commissioning flowchart of this EVSE is as follows:

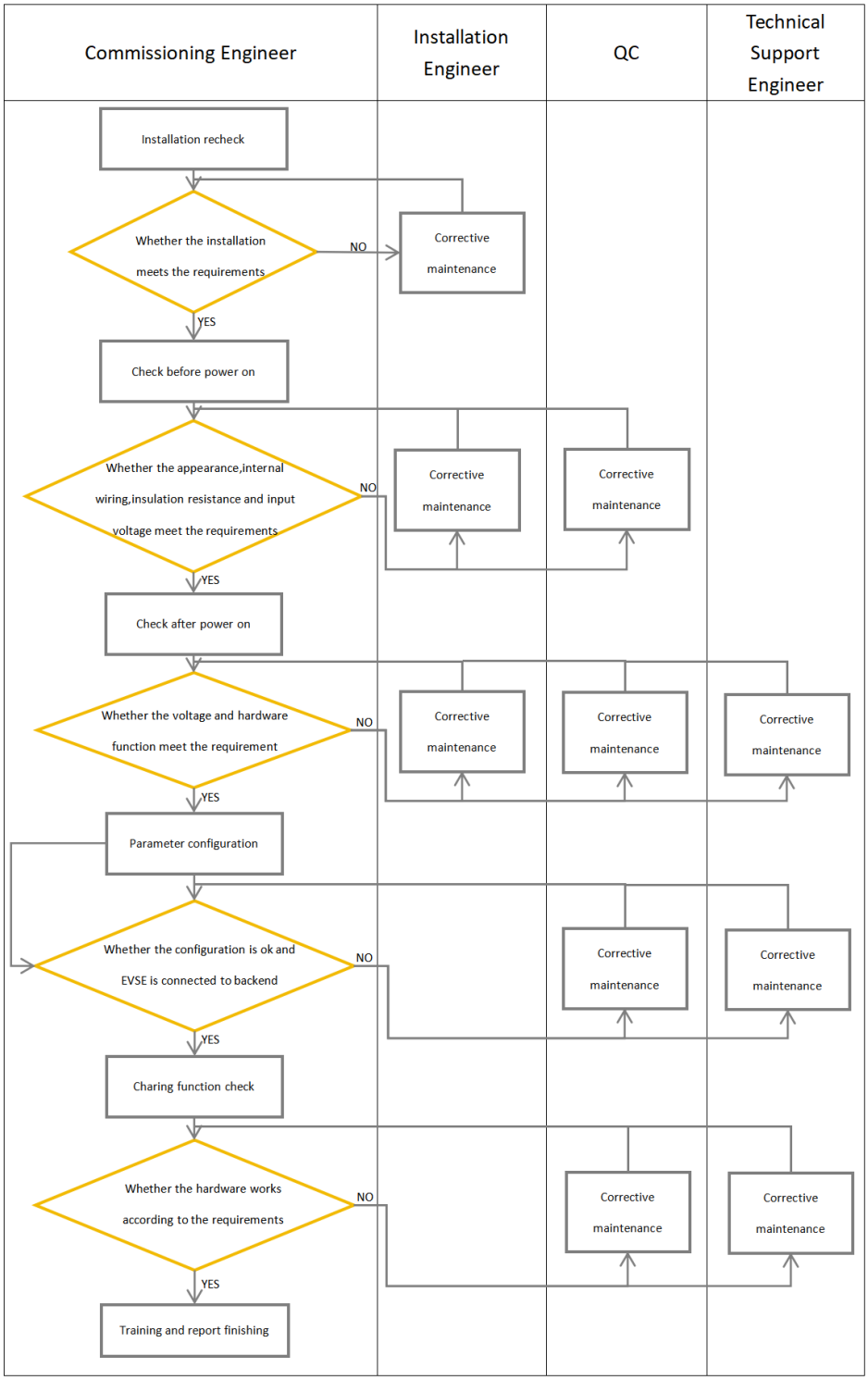


Figure 6-1 Commissioning flowchart

6.3 Installation recheck

Before commissioning the EVSE, make sure the following meet the installation requirements. Complete all the checkpoints and record any items that do not meet the requirements in Appendix 5-2.

- Check the equipment spacing (refer to Chapter 5.2).
- Check the cement foundation (refer to Chapter 5.4).
- Check the input voltage and current, and the distribution capacity (refer to Chapter 9.1.2).
- Check the cables (refer to Chapter 5.3) and cable wiring (refer to Chapter 5.8.2).

6.4 EVSE power on and check

6.4.1 Pre-power-on check

6.4.1.1 Visual check

Complete all the checkpoints and record any items that do not meet the requirements in Appendix 5-3.1.

- **Appearance**
  - Check whether the enclosure of the EVSE is clean and if there is any paint peeling, scratches, deformation, dents, cracks, or gaps.
  - Check whether the energy meter observation window (A), the touch screen (B), the connector holder (C) are free of cracks and if the frames are sealed without gaps.

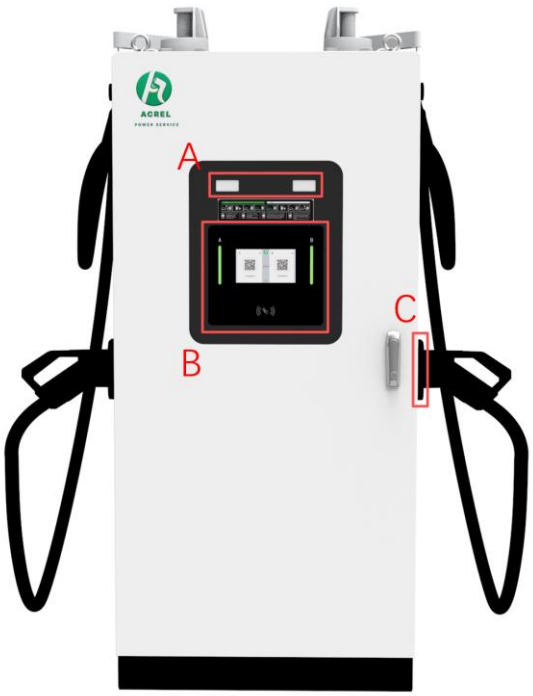


Figure 6-2 Appearance check

- **Nameplate**: Check whether the nameplate is clear and intact, and if the safety symbols are properly

attached.

- **Documents**: Check whether the configuration information of the on-site EVSE conforms to the requirements of the contract, and if the accompanying documents (refer to Chapter 4.3.1) are complete.
- **Sealing**
  - ○Check whether the rubber seals of the door frame are free of falling off, deformation, and damage, and if the rubber seals can fully fit the door panel after closing.
  - ○Check whether the glands of the charging cables are sealed and not loose.
- **Protection film:** Check whether all of the protective films of the EVSE have been removed, such as the films covering safety symbols, the touch screen, the energy meter, and payment devices.

6.4.1.2 Environmental condition check

Refer to Chapter 9.1.4 for the environmental conditions that this EVSE can operate in. Complete the checkpoints and record any items that do not meet the requirements in Appendix 5-3.2.

6.4.1.3 Internal wiring check

Check whether the following wiring meets the requirements. Complete the checkpoints and record any unqualified items in Appendix 5-3.3.

- **Short circuit:** Check the input power cable connecting power distribution cabinet to the EVSE. Check whether there's any short circuit between the 3-phase live wire, the neutral wire and the grounding wire, and verify if the phase sequence is correct.
- **Voltage check before power on:** Before powering on the EVSE, check whether the input voltage of the main breaker inside of the EVSE is correct, and ensure there's no faults, such as phase loss, overvoltage, undervoltage, or wrong phase sequence.
- **Screws fasten:** Check whether the fastening torque of each line connection, connector, terminal with screw, and copper busbars meets the requirements, and whether there is any loosening, poor connection, etc.

Follow the instruction below to do the internal wiring check:

(1) Open the doors of the EVSE.

(2) **AC terminal check:** Check whether all of the screws and the wiring connections at the contact points of AC input circuit are tightened properly, such as input AC copper busbars, MCCB, AC contactor, MCB. If any loose screws are found use the appropriate toil to tighten them.

(3) **DC terminal check:** Check whether all of the screws and the wiring connections at the contact points of DC output main circuit are tightened properly, such as power modules or DC output contact points on the DC busbars, DC relay, shunt, fuse, DC terminal of the charging cable. If any loose screws are found, use the appropriate tool to tighten them.

6.4.1.4 Insulation resistance check

To check the insulation resistance, you will need a megohmmeter.

- Refer to Appendix 5-3.5 for the specific checkpoints and record any items that do not meet the requirements.
- Follow the local regulations when it comes to the insulation resistance of the input.

Do not test with the megohmmeter if:

- It makes an abnormal sound after being turned on.
- The battery cover is open.
- The live line warning symbol A is displayed or the buzzer emits a warning sound.

Connect the megohmmeter to the objects:

1) Connect the black test lead E to the grounding busbar of the EVSE. The insulation resistance should be no less than 10 megohm at 500 volts.

2) Connect the red test lead L to the DC+ or DC- copper busbars of the EVSE. The insulation resistance should be no less than 1 megohm at 1000 volts.



Figure 6-5 Grounding busbar

6.4.2 EVSE Power on



You must follow these steps carefully to turn on the EVSE. Be careful of electric shock and wear protective gloves and shoes.

(1) Turn on breakers which provides power from transformer to power distribution cabinet.

(2) Turn on breakers which supply power to EVSE.

(3) Turn on breakers inside of EVSE.

6.4.3 Post-power-on check

Check whether the following hardware functions meet the requirements. Complete the checkpoints and record any unqualified items in Appendix 5-4.2.

- **Voltage**: Check that the output voltage of the main breaker inside the EVSE is correct and that there are no faults, such as phase loss, overvoltage, undervoltage, or wrong phase sequence.
- **Touchscreen**: Check that the touchscreen displays normally, without any dead pixels, and that the words are clearly displayed. Make sure that the touch screen is operating well and has a clear user interface (UI).
- **LED status indicator**: Check that the LED status indicator on the EVSE functions well according to the design requirements.
- **Power supply unit (PSU)**: The PSU can provide a stable voltage. Use an electrical multimeter to check that the output voltage of the PSU inside the EVSE meets the requirements.
- **Residual current circuit breaker with overcurrent protection device (RCBO)**: Press the "Test" button on the RCBO to check whether the device trips.

6.5 Web connection

(1) After opening the door of the EVSE, disabling the door switch, and powering on the EVSE. Connect the laptop to the LAN port of the router with a network cable.

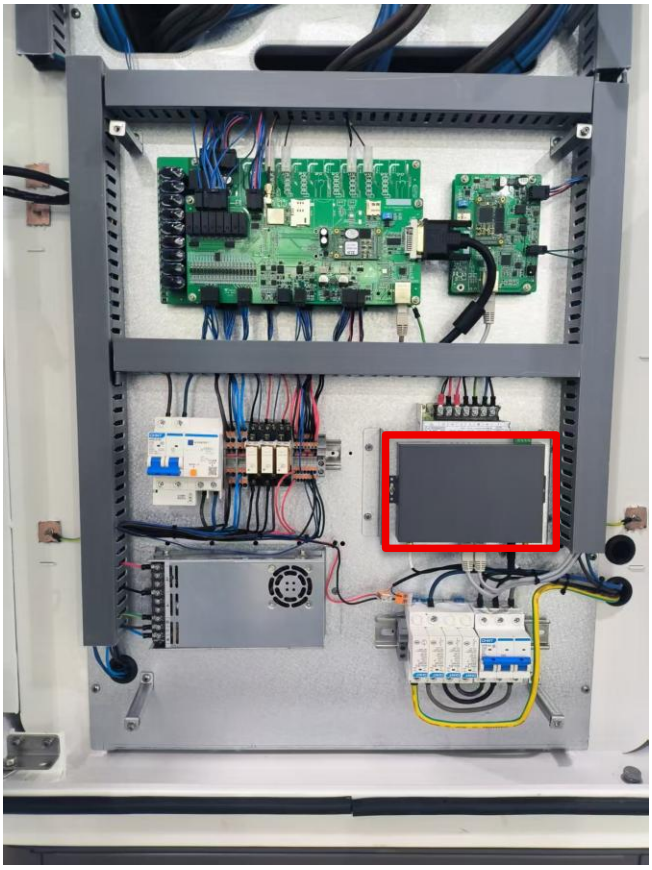


Figure 6-8 Location of the router

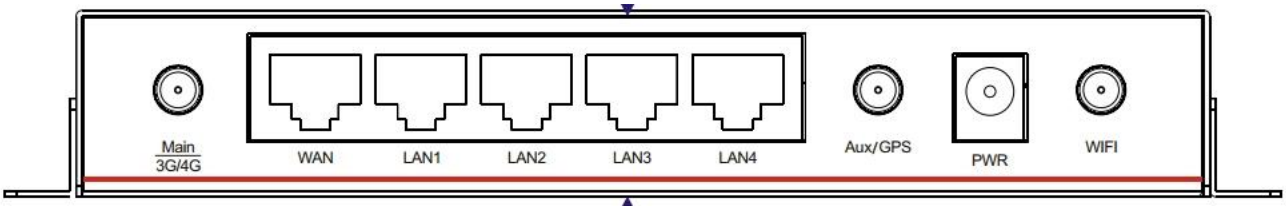


Figure 6-9 Location for LAN connection with router

(2) Configure the IP address of the laptop to 192.168.1.100.

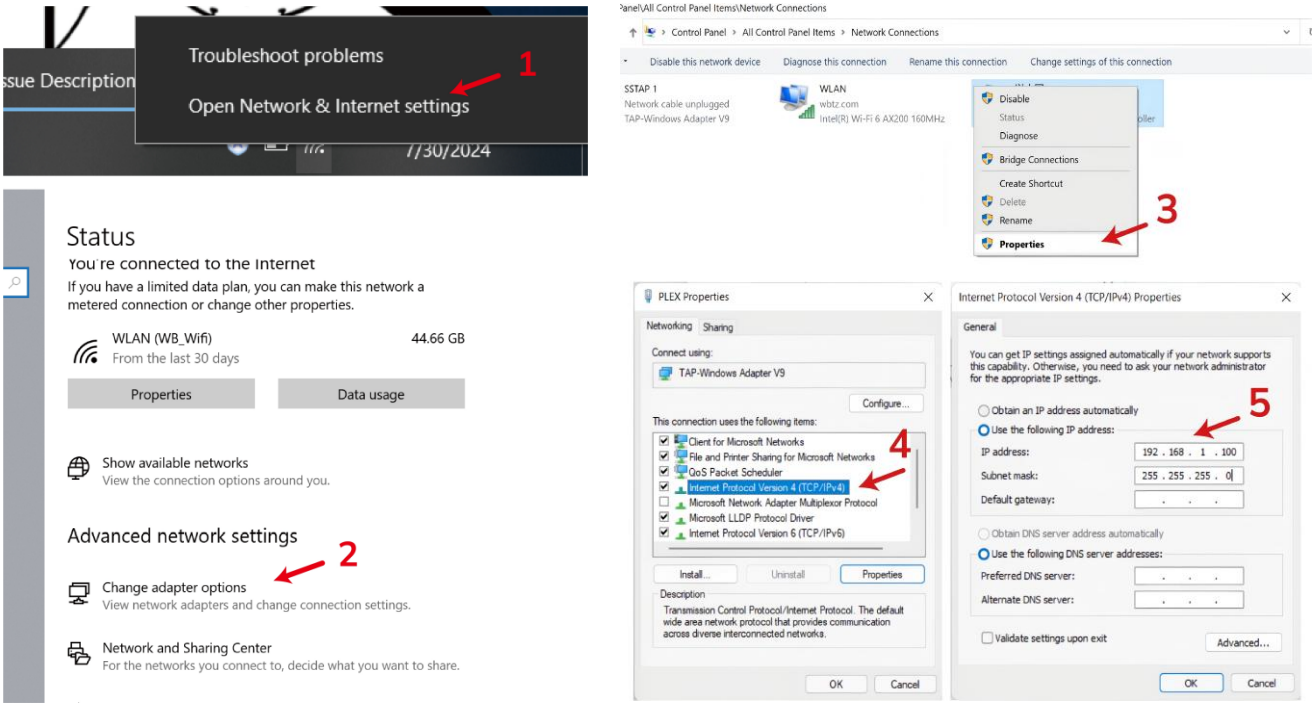


Figure 6-10 Configure IP address on Windows 10

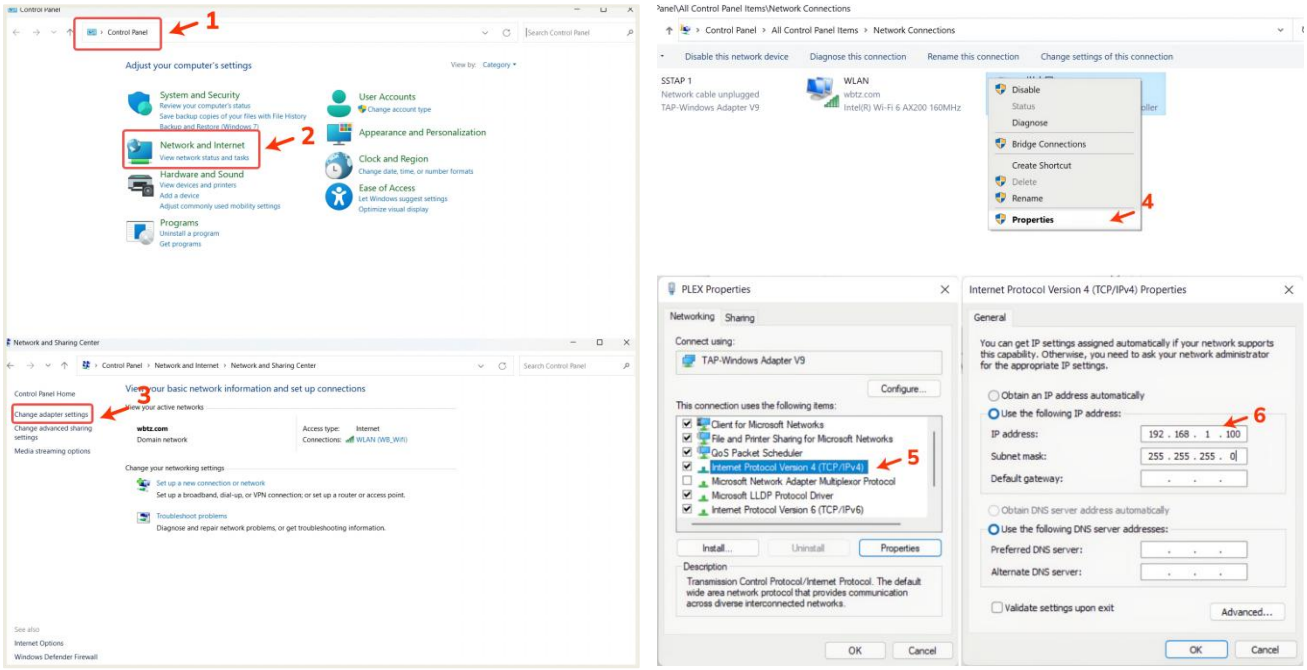
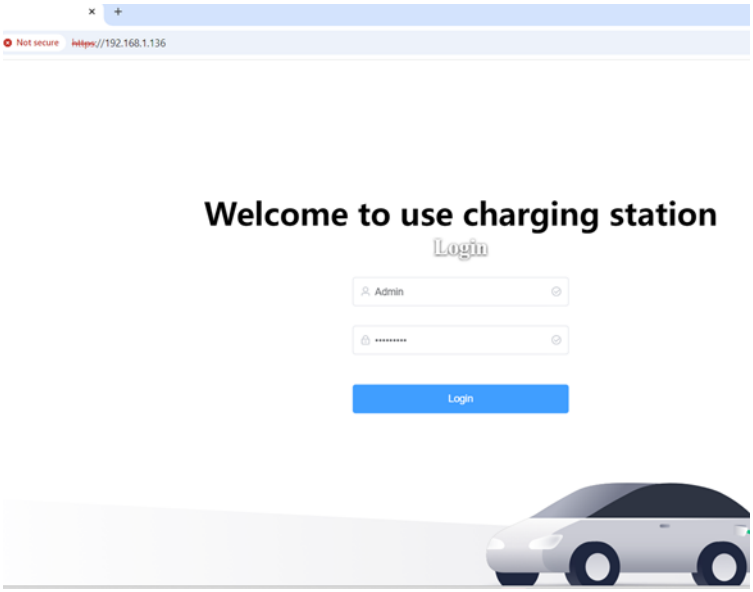
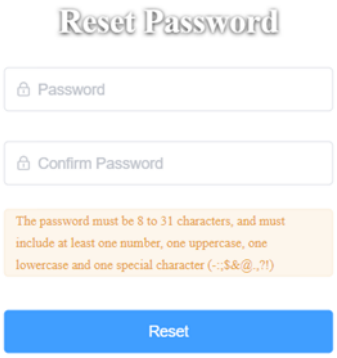


Figure 6-11 Configure IP address on Windows 11

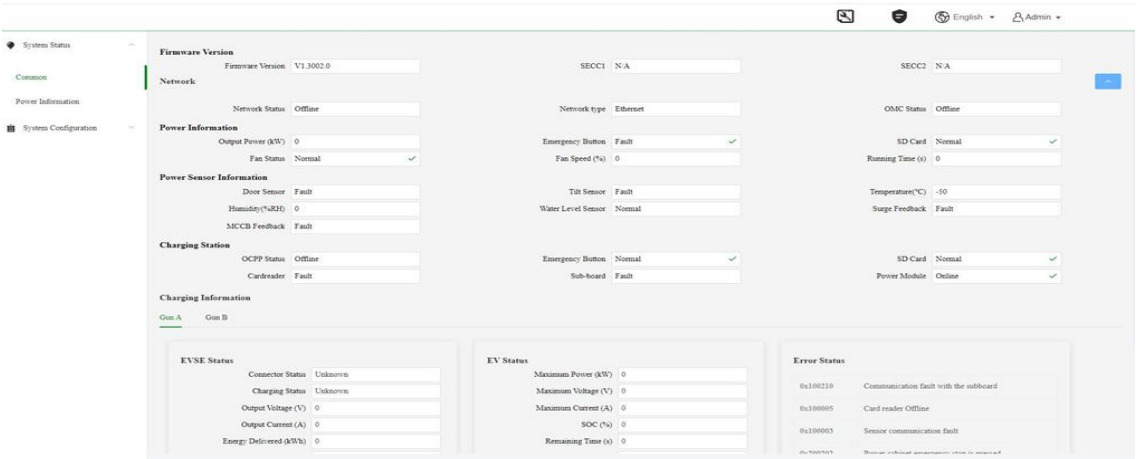
(3) Open a browser (Chrome is recommended), enter 192.168.1.136, and enter the username (Admin) and the password (1234) to log into the web configuration page.



(4) Reset your username and password according to the system requirements when logging into the page for the first time.



(5) Log into the web configuration page with the new username and password.



6.6 Web configurations

6.6.1 Network connection

You can connect the EVSE to the internet via 4G or a wired Ethernet connection.

6.6.1.1 4G Connection

(1) Open the front door of the EVSE, and insert the SIM (mini-SIM) card into the A7 board.

If you insert the SIM card while the EVSE is powered on, it is necessary to reboot the system.

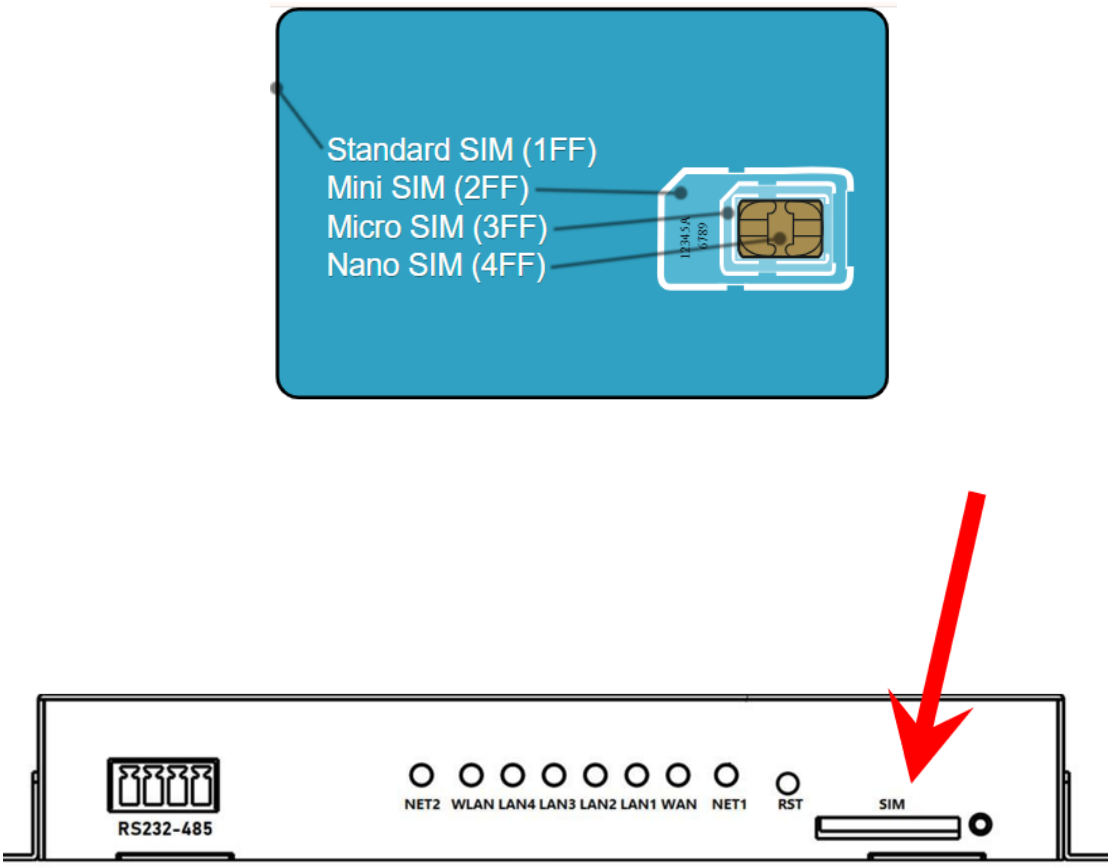


Figure 6-12 Example of the SIM card and location of the A7 board

(2) Do the web connection and log into the web configuration page.

(3) Click **System Configuration > Network Configuration** in the left navigation panel.

(4) In **Mode and Priority**, click "✎" to configure the priority for different networking methods.

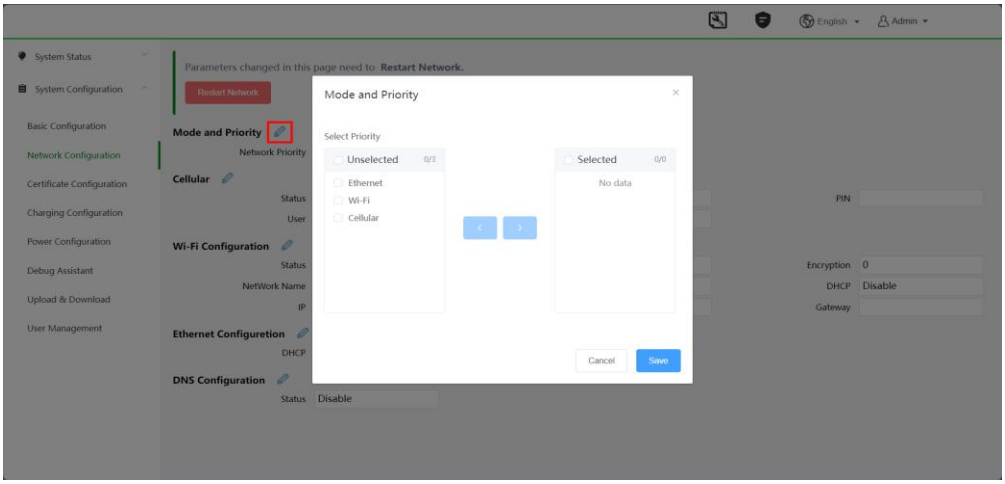


Figure 6-14 Configure the priority of the networking methods

(5) In **Cellular**, click "✎" to **Enable** or **Disable** the 4G connection, and configure **APN**, **PIN**, **User**, and **Password** according to the actual needs.

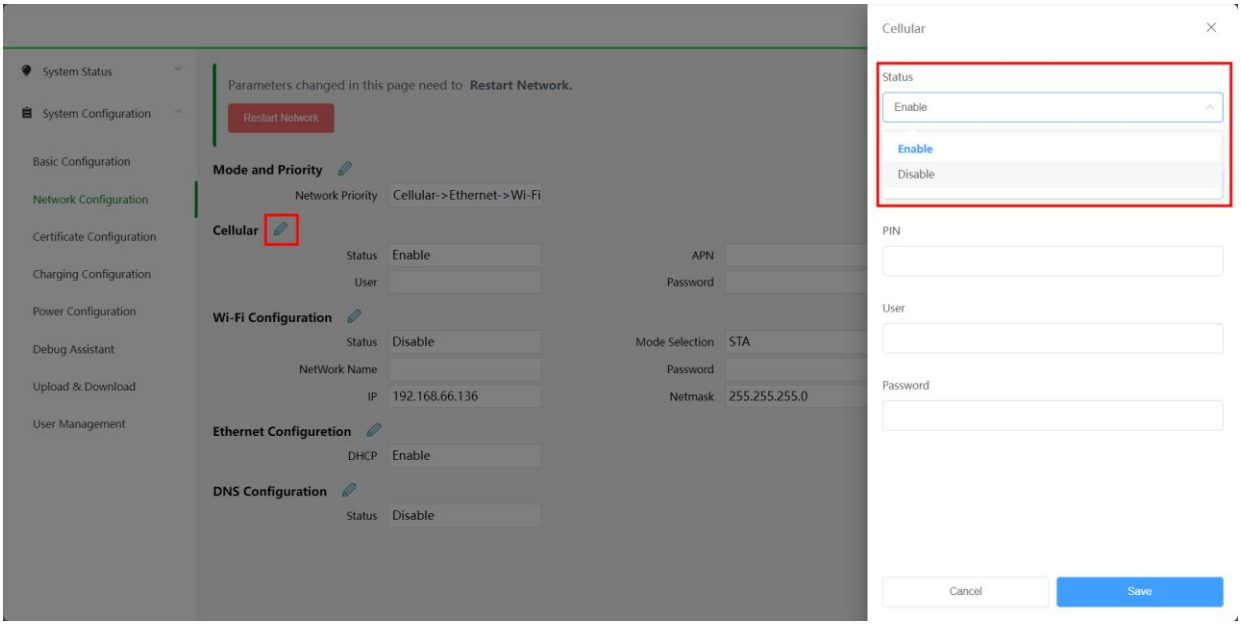


Figure 6-15 Configure the 4G connection

(6) Click **Save**.

6.6.1.2 Ethernet connection

Make sure the Ethernet cable has been inserted into the mainboard of the EVSE.

(1) Do the web connection and log into the web configuration page.

(2) Click **System Configuration > Software Configuration** in the left navigation panel.

(3) In **Mode and Priority**, click "✎" to configure the priority for different networking methods.

(4) In **Ethernet Configuration**, click "✎" to **Enable** or **Disable DHCP**. If DHCP is enabled, the default parameters of Ethernet can be obtained automatically.

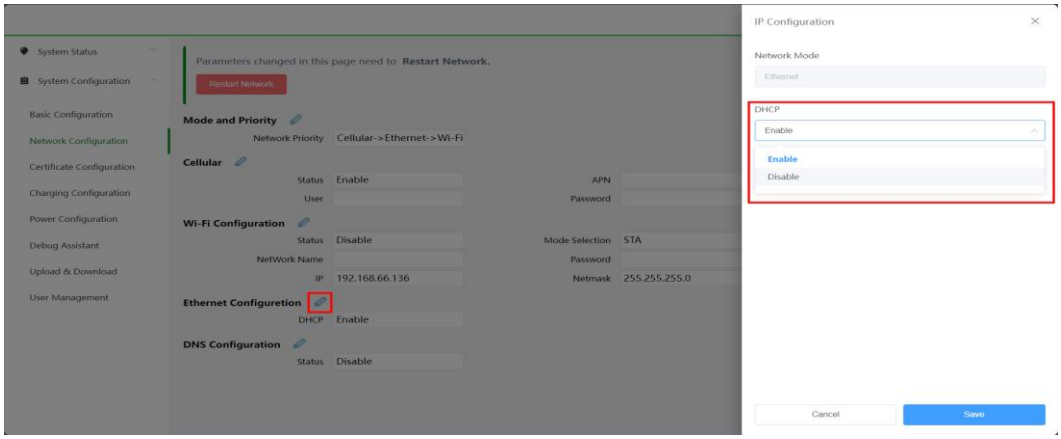
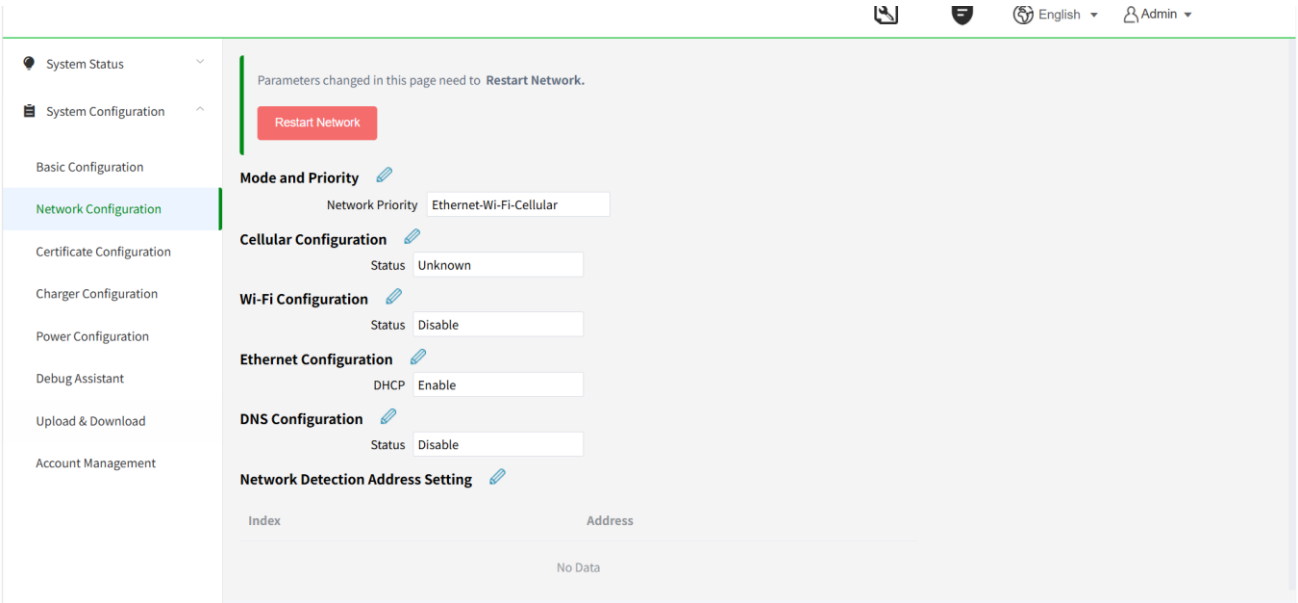


Figure 6-16 Configure the Ethernet connection

(5) click "✎" to **Wi-Fi Configuration** to change LAN settings include settings IP ,subnet and gateway;



(6) Click **Save**.

6.6.2 OCPP configuration

(1) Click **System Configuration > Basic Configuration** in the left navigation panel.

(2) In **OCPP Configuration**, click "✎" to configure the following parameters:

- **IP or Domain Name:** Set the IP or domain name for OCPP.
- **Security Profile:** Select one of the following modes for secure connection, including Unsecured Transport, Unsecured Transport with Basic Authentication, TLS with Basic Authentication, and TLS with Client Side Certificates.
- **Port:** Enter the port number of the OCPP address（URL）.
- **Path:** Enter the path of the OCPP address.
- **Authorization key**: It is the password for OCPP platform. This field does not require any configuration, simply leave it blank.
- **Customer number**: It is the OCPP backend customer number. This field has been set in advance. The modification of the customer number may lead to the abnormal function of the EVSE.

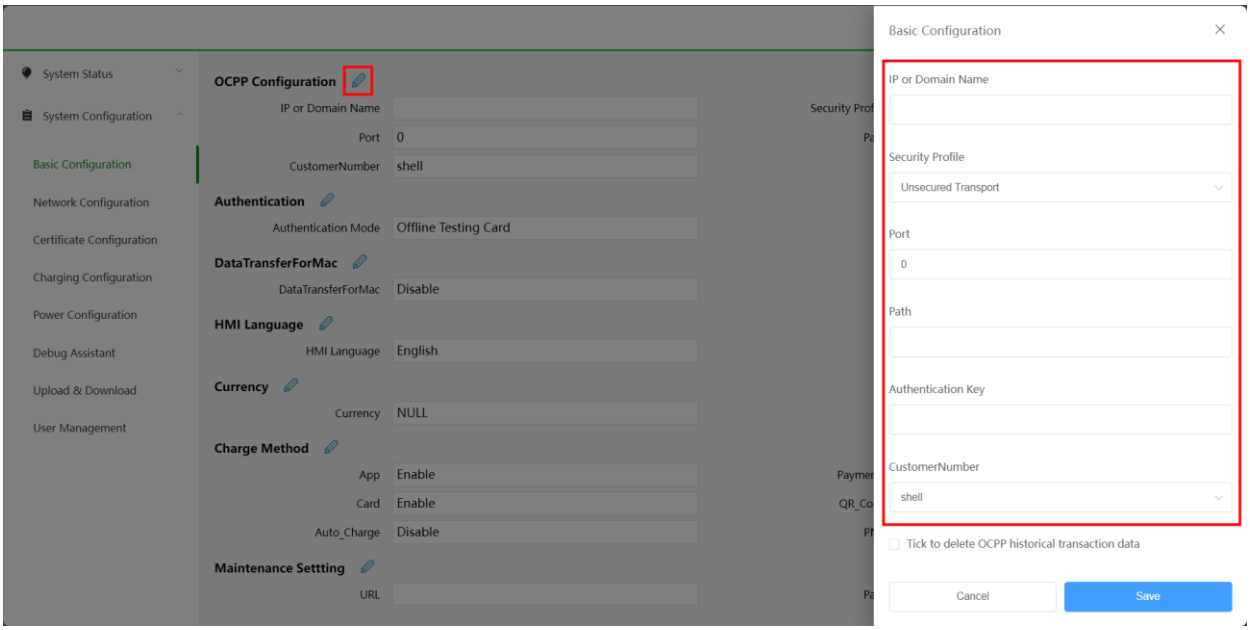


Figure 6-17 Configure the OCPP

(3) Click **Save**.

6.6.3 Authentication method configuration

(1) Click **System Configuration > Basic Configuration** in the left navigation panel.

(2) In **Authentication>Authentication Mode**, click the pencil icon to select one of the following mode:

- **Online Card Authentication (APP, RFID, Credit card) / Backend Authentication:** Authentication can be done via the APP, RFID card, QR code, credit card, and the RFID whitelist. The UID in the whitelist of the RFID card must be authenticated by backend before using, and the EVSE must connect to the OCPP backend.
- **Offline Testing Card / Local Authentication**: No authentication is required. The EVSE can start charging by simply swiping the RFID card without a backend connection.
- **Offline Plug and Play / Local PnC**: No authentication is required. The EVSE can start charging by plugging in the connector into the EV.
- **Online MAC ID Authentication / AutoCharge:** Authentication is carried out via an online MAC ID, which must be authenticated by backend or listed in the local whitelist. In this case, the EVSE can start charging by plugging in the connector into the EV. However, if the MAC ID is invalid, you can just authenticate via the APP, RFID card, QR code, credit card, and the RFID whitelist while the EVSE is connected to the backend.

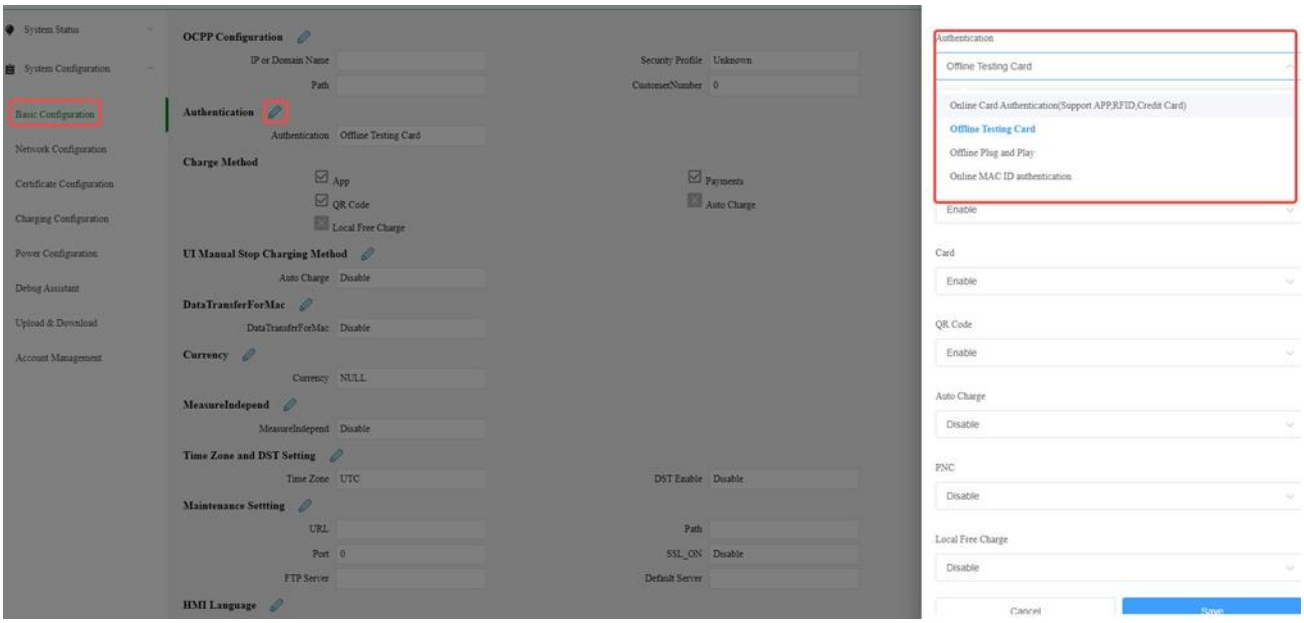


Figure 6-18 Configure the authentication method

(3) Click **Save**.

6.6.4 Charging Configuration

6.6.4.1 Firmware update

(1) On **Basic Configuration**, enter the charger ID, group number (default: 1234), Alternating charging (1-1), Connector A and B ID as 1 & 2, QR code for both of the connectors.

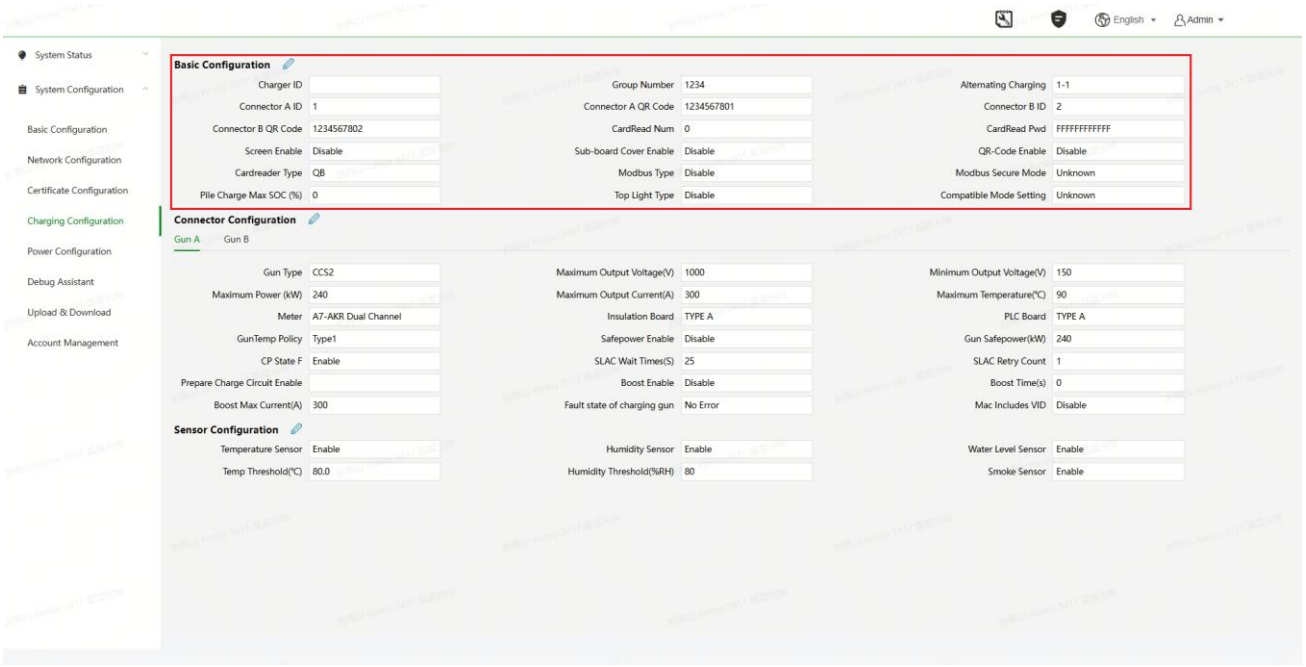


Figure 6-14 Charging Configuration

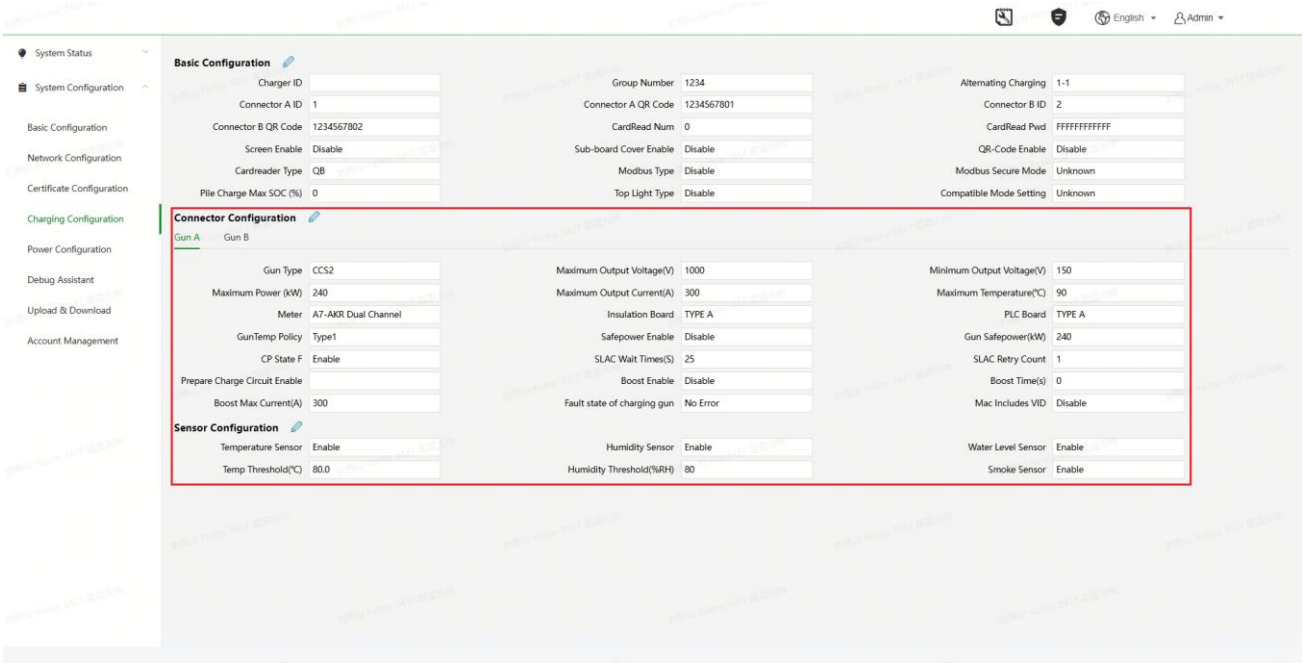
(2) Click **Save**.

6.6.4.2 Connector Configuration

To configure the output parameters for each of the charging connectors (**Connector A and Connector B**). Click on the edit button, and check for the following:

- **Gun Type**: CCS2
- **Maximum Output Voltage (V)**: Maximum output voltage of the charging connector ,**1000V**
- **Minimum Output Voltage (V)**: Minimum output voltage for the charging cable, default and minimum value is **150V**
- **Maximum Power (kW)**: Maximum output power for the charging cable, enter the value based on the quantity (X) of the power modules installed, default and maximum value is **240kW**
- **Maximum Output Current (A)**: Maximum output current for the charging cable is **300A**
- **Maximum Temperature (℃)**: Maximum temperature for the charging cable is 90°C

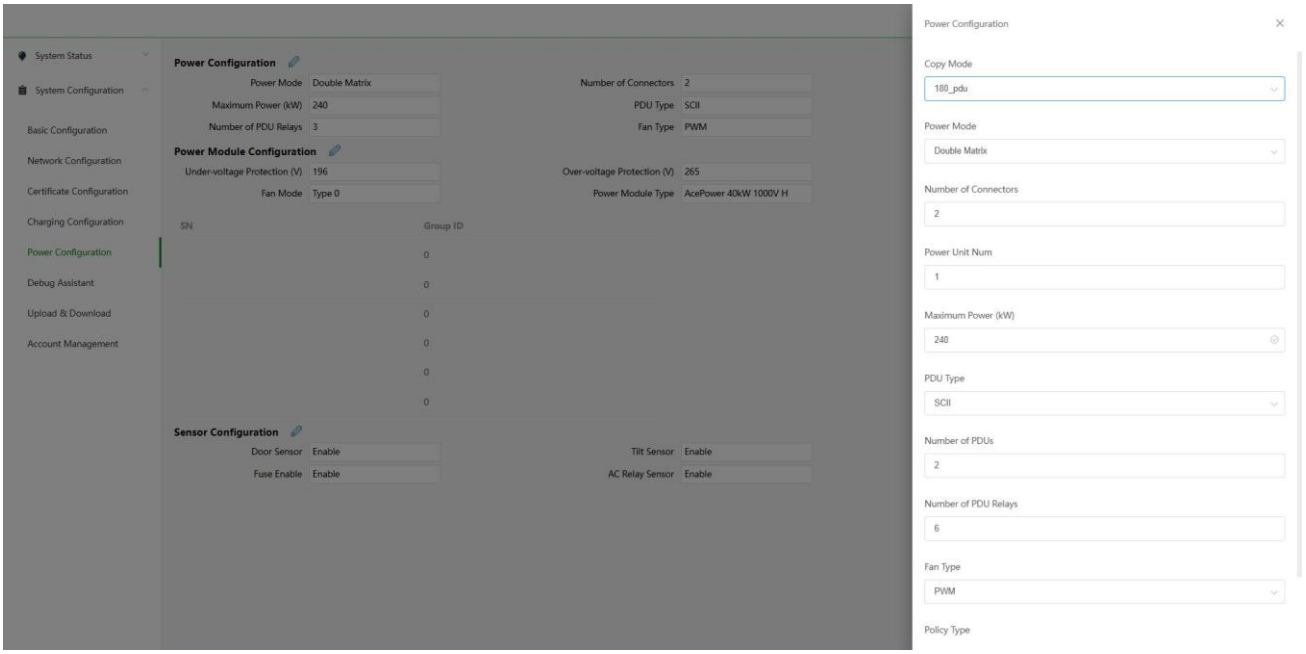
Note: Keep others in default.



6.6.4.3 Power Configuration

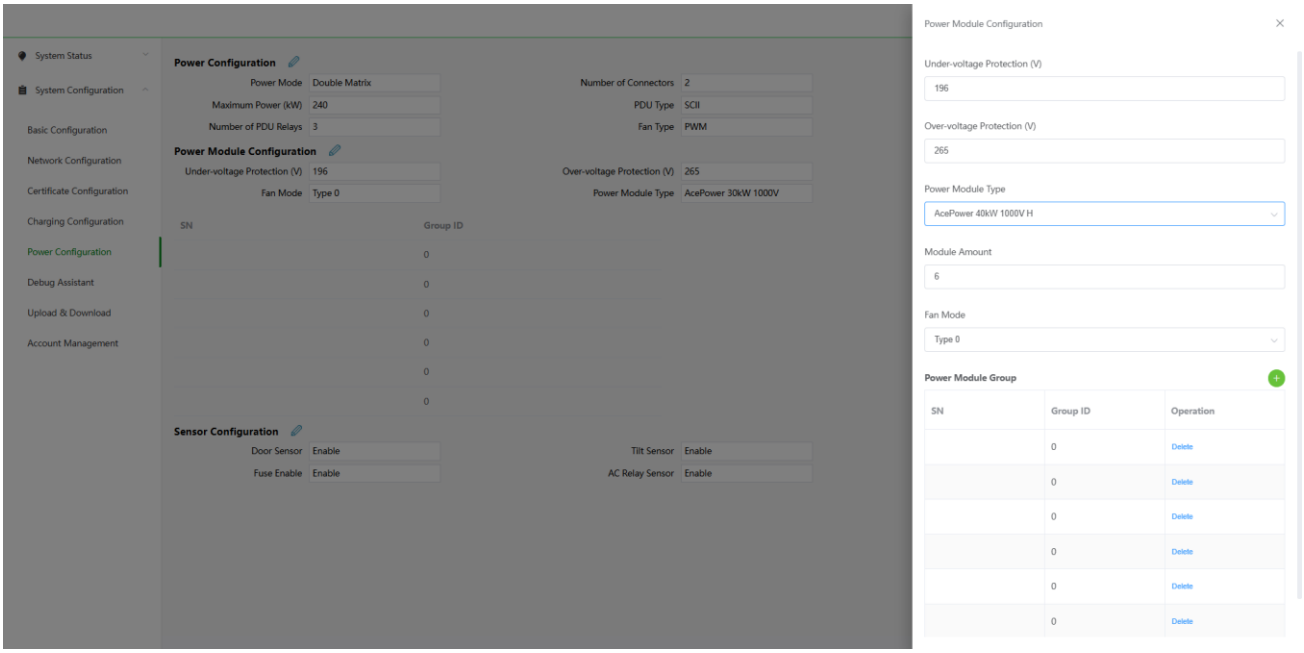
(1) Click **System Configuration > Power Configuration.**

- For Power Configuration select 180_pdu
- Module layout: Hand in Hand
- Policy type:
  - Priority of Power (Output according to the requirement form EV)
  - First come First serve
  - Divide equally (Output equally)



(2) Power Module Configuration:

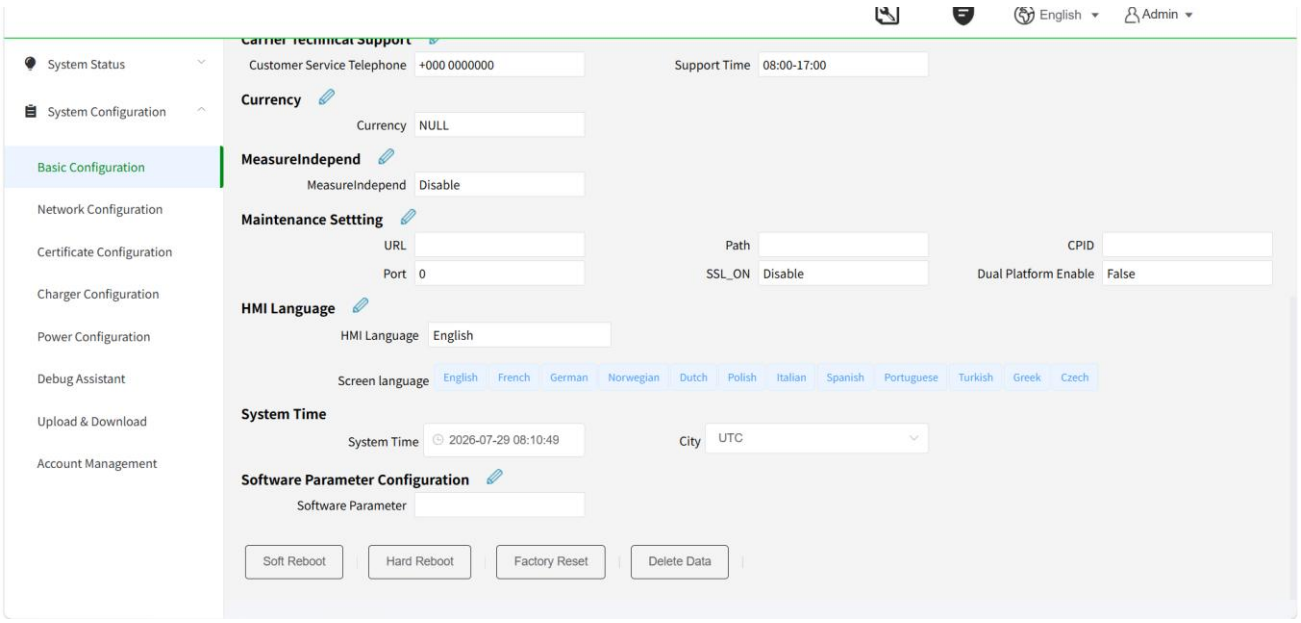
- Under-voltage protection (196V)
- Over-voltage protection (265V)
- Module amount (6)
- Power Module Type (ACE40KW 1000V)



(3) Click "**+**" to add modules and "**Delete**" to remove the number of modules. Define the serial number and address of the modules according to the address shown by the label on the module rack.

6.6.4.4 Reboot hardware and software

(1) Click **Basic Configuration > Soft Reboot/ Hard Reboot**



6.7 Firmware update

Firmware update is not a necessary step during commissioning. Contact with Acrel engineer for more details.

6.7.1 Update via web

(1) Do the web connection and log into the web configuration page.

(2) Click **System Configuration > Upload & Download** in the left navigation panel.

(3) Drag or upload the zip file in **Firmware Upgrade** to upgrade the firmware of the EVSE.

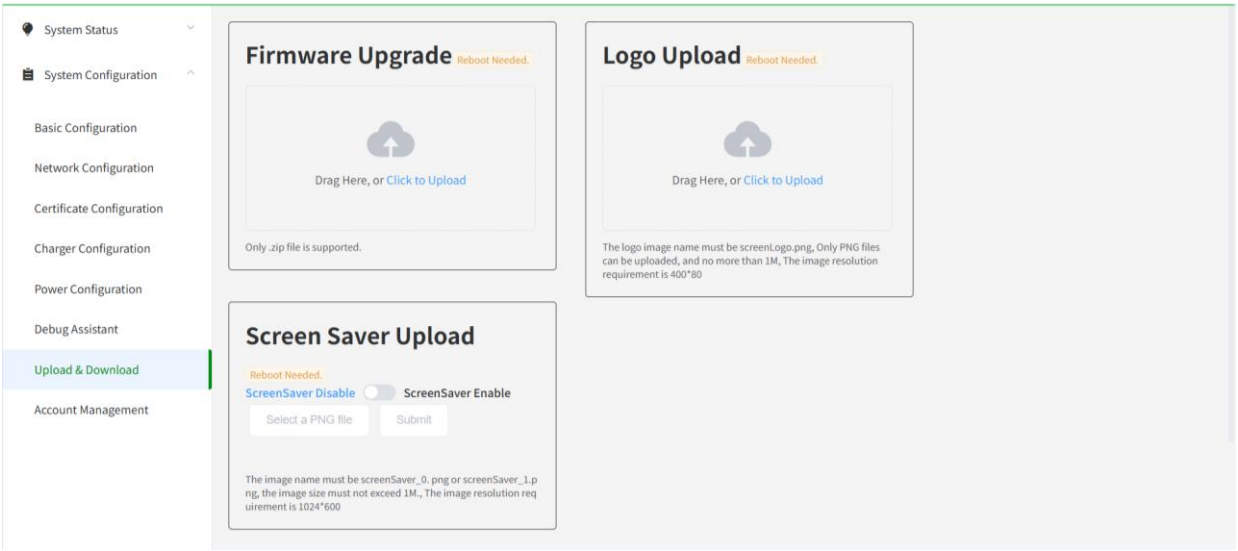
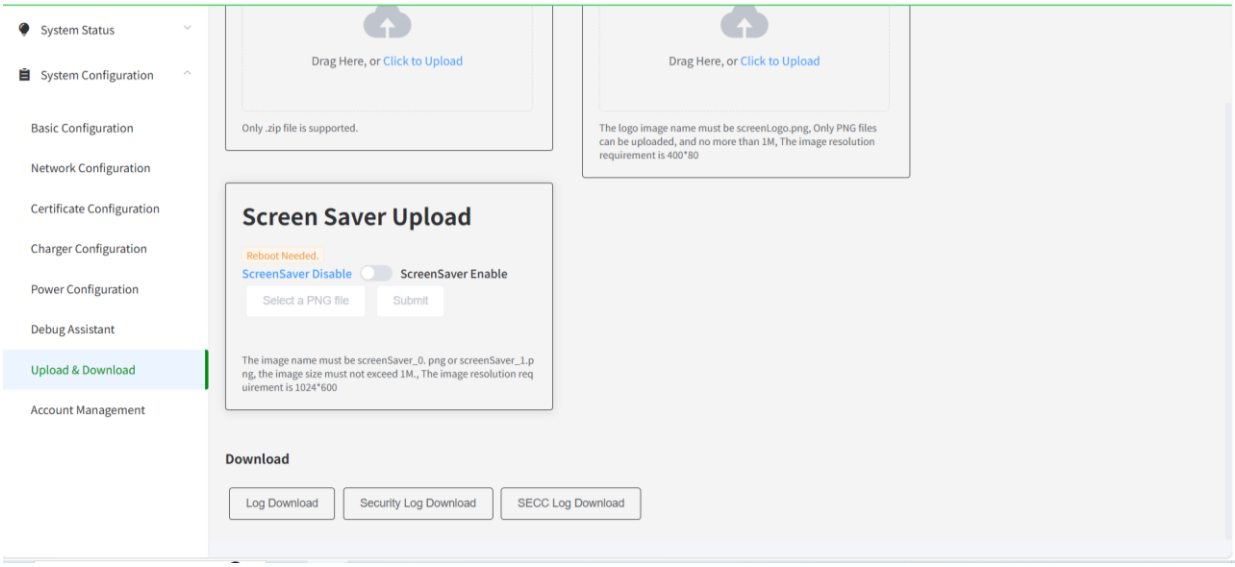


Figure 6-15 Update the firmware

(4) Log Download



6.8 Charging function check

6.8.1 Charging test

Follow the instructions in the user manual to perform the charging test. Complete the checkpoints and record any unqualified items in Appendix 5-5.1.

6.8.2 Hardware function test

Check whether the following hardware functions meet the requirements. Complete the checkpoints and record any unqualified items in Appendix 5-5.2.

- **Door sensor**: Open the EVSE door while charging. The EVSE should stop charging.
- **Tilt sensor**: Tilt the tilt sensor inside the EVSE while charging. The EVSE should stop charging.
- **Emergency stop**: Press the emergency stop on the EVSE while charging. The EVSE should stop charging.
- **Fan**: Check whether the fan inside the EVSE and the fan of the power module operate during charging.
- **Meter**: Check whether the meter displays accurately during charging.
- **Charging cable**: Make sure that the charging cables have no burrs, sharp edges, or signs of ignition or burning. The insulation cap on the easy-touch surface of the charging cable must be securely fastened. The charging cable should not be too tight or too loose when inserting and pulling out the charging connector.
- **Relays**: Relays should be open or closed normally.

6.9 Customer training

After completing the EVSE commissioning work, the engineer should provide the customer with basic training on the main features of the EVSE. This training is to help the customer learn how to use the EVSE and give them essential knowledge. The training can be in the form of written documentation or practical on-site explanations. The training content should include safety information, the basic charging procedure, and other relevant topics.

Once the customer is satisfied with the training, the engineer should get the customer's signature and properly record the training file. Refer to Appendix 4 Customer Training Record Sheet for details.

6.10 Appendix

Appendix 4 Customer Training Record Sheet

Customer Training Record Sheet

Customer:

Project Name		Trainer	
Product Name		Training method	
Training Department		Training Date	
Training Content			
Training Purpose			
Training Content Outlines	1. Basic charging procedure □ 2. Emergency stop usage scenario □ 3. Common sense of safety and emergency □ 4. Troubleshooting process □		
Trainee Signature			
Customer feedback			
Customer:		Project Manager:	

Appendix 5 Commissioning Report

Commissioning Report

Date:

Commissioning Engineer:

Charging Station:

Address:

1 Details of EVSE

ID	Specification	Power module type	Power module quantity	Installation	Charging cable length	Firmware version	Backend

2 Installation recheck

Item	Content	Conclusion	Remark
Foundation	Check whether the foundation is fixed completely	□ Pass □ Fail	
Power Cable	Check whether the cable specifications meet the power requirements of EVSE, no break, damage, or scratch, whether the electrical connection and wiring are correct and complete, whether the connection is solid, and whether the grounding is reliable	□ Pass □ Fail	
Insulation Resistance	The insulation resistance of power cable meets the requirements	□ Pass □ Fail	

3 Check before power on

3.1 Visual check

Item	Content	Conclusion	Remark
Appearance	The enclosure of the EVSE is clean. The charging cable is not broken. The EVSE is not tilted. The QR code is clear.	□ Pass □ Fail	
Sign	No missing safety symbols and the nameplate is correct and clear.	□ Pass □ Fail	
Components	The EVSE is the required type. The accessories are complete, including user manual, factory inspection report, and the random documents of qualification certificate.	□ Pass □ Fail	
Sealing objects	The fireproof mud is blocked in place.	□ Pass □ Fail	

3.2 Environmental condition check

Item	Content	Conclusion	Remark
Operating Temperature	-30℃ to 50℃	□ Pass □ Fail	
Humidity	5% to 95%	□ Pass □ Fail	
Altitude	≤2000m	□ Pass □ Fail	

3.3 Internal wiring check

Note: When using a multimeter to test the following items, ensure that EVSE is off.

Item	Content	Conclusion	Remark
Input L1 and L2	Open Circuit	□ Pass □ Fail	
Input L1 and L3	Open Circuit	□ Pass □ Fail	
Input L2 and L3	Open Circuit	□ Pass □ Fail	
Input L1 and N	Open Circuit	□ Pass □ Fail	
Input L2 and N	Open Circuit	□ Pass □ Fail	
Input L3 and N	Open Circuit	□ Pass □ Fail	
Input L1 and PE	Open Circuit	□ Pass □ Fail	
InputL2 and PE	Open Circuit	□ Pass □ Fail	
InputL3 and PE	Open Circuit	□ Pass □ Fail	
N and PE	Close Circuit	□ Pass □ Fail	
Input L1 and DC+/DC-	Open Circuit	□ Pass □ Fail	
Input L2 and DC+/DC-	Open Circuit	□ Pass □ Fail	
Input L3 and DC+/DC-	Open Circuit	□ Pass □ Fail	
N and DC+/DC-	Open Circuit	□ Pass □ Fail	
DC+ and DC- of charging cable	Open Circuit	□ Pass □ Fail	

Item	Content	Conclusion	Remark
DC+ and DC- of output copper bar	Open Circuit	□ Pass □ Fail	
DC+ of charging cable and DC+ of output copper bar	Close Circuit	□ Pass □ Fail	
DC- of charging cable and DC- of output copper bar	Close Circuit	□ Pass □ Fail	
Apply a resistance (< 100kΩ) between DC+ and PE, then plug in the charging connector, start charging, and check the charger's running state	Optical signal must be sent by the DC supply to the user and terminate the supply process	□ Pass □ Fail	
Open the control pilot circuit during equipment operation	Disconnect the supply within100 ms	□ Pass □ Fail	
All screws of input	All screws are fastened without loosening or missing	□ Pass □ Fail	
All screws of main breaker	All screws are fastened without loosening or missing	□ Pass □ Fail	
Screws on the input and output of the power module socket	All screws are fastened without loosening or missing	□ Pass □ Fail	
All grounding screws	All screws are fastened without loosening or missing	□ Pass □ Fail	
Screws on DC+ and DC- copper bar	All screws are fastened without loosening or missing	□ Pass □ Fail	
Each plug on the main control board	Each plug is firmly without loosening, and the plug connection is firmly without loosening	□ Pass □ Fail	
Switching power supply	All screws are fastened without loosening or missing	□ Pass □ Fail	

3.4 Voltage check before power on

Item	Content	Conclusion	Remark
Input Voltage of the Main Breaker	400V ± 15% for line voltage	□ Pass □ Fail	

3.5 Charging cable insulation resistance check

Item	Content	Conclusion	Remark
DC+ and PE	≥1MΩ	□ Pass □ Fail	
DC- and PE	≥1MΩ	□ Pass □ Fail	
DC+ and DC-	≥1MΩ	□ Pass □ Fail	

4 Check after power on

4.1 Voltage check after power on

Item	Content	Conclusion	Remark
Output Voltage of the Main Breaker	400V ± 15% for line voltage	□ Pass □ Fail	

4.2 Basic check

Item	Content	Conclusion	Remark
Touchscreen	The screen shows normally	□ Pass □ Fail	
Indicators	The indicator lights work normally	□ Pass □ Fail	
Switching Power Supply	The switching power supply can provide 12V normally and stably	□ Pass □ Fail	
Residual Current Device	Press the “Test” button. It should be tripped	□ Pass □ Fail	

4.3 Parameter configuration check

Item	Content	Conclusion	Remark
Configuration	Configure according to the requirements	□ Pass □ Fail	
Backend Connection	Connect successfully	□ Pass □ Fail	

5 Charging function check

5.1 Charging testing

Item	Content	Conclusion	Remark
Charging via APP	Start and stop charging via APP	□ Pass □ Fail	
Charging via Tapping RFID Card	Start and stop charging via tapping RFID card	□ Pass □ Fail	
Charging via Plug in and Charge Mode	Start and stop charging via plug in and charge mode	□ Pass □ Fail	
Charging via MAC Start Mode and QR code	Start and stop charging via MAC start mode	□ Pass □ Fail	

5.2 Hardware function check

Item	Content	Conclusion	Remark
Door Switch	The EVSE should stop charging if the door is opened while it is charging.	□ Pass □ Fail	
Tilt Sensor	The EVSE should stop charging if the tilt sensor is tilted while it is charging.	□ Pass □ Fail	
Emergency stop button	The EVSE should stop charging if the emergency stop button is pressed while it is charging.	□ Pass □ Fail	
Fan	Check that the fan inside the EVSE and the fan of the power module are operating while the EVSE is charging.	□ Pass □ Fail	
Energy meter	Check that the meter is displaying accurate information while the EVSE is charging.	□ Pass □ Fail	
Charging Cable	Check that the charging cable has no burrs, sharp edges, or signs of ignition or burning. The insulation cap on the easy-touch surface of the charging cable should be securely fastened. The charging cable should not be too tight or too loose when inserting and pulling out the charging connector.	□ Pass □ Fail	
Relay	Check that the relays are open or closed normally.	□ Pass □ Fail	

6 Conclusion

EV Model	Required Voltage (V)	Required Current (A)	Output Voltage (V)	Output Current (A)	Remark

Conclusion	Remark
□Pass □Fail	

Commissioning Engineer: **Customer:**

Date:

7 Maintenance

7.1 Prerequisites

Before you start any preventive maintenance on your EVSE, make sure you have read and understood all of the safety and usage instructions in Chapter 2. This is important to prevent any accidents or injuries.

7.2 Preventive maintenance

The frequency of preventive maintenance for your EVSE will depend on the environment in which it is installed and the applicable national laws and regulations. For example, if your EVSE is installed outdoors, it will need to be maintained more frequently than if it is installed indoors.

All preventive maintenance should be carried out by a qualified technician. This is important to ensure that the maintenance is done correctly and safely.

The specific preventive maintenance tasks that should be performed will vary depending on the type of EVSE you have. However, some common tasks include:

- Inspecting the EVSE for signs of damage or wear and tear.
- Cleaning the EVSE and its components.
- Testing the EVSE to ensure that it is functioning properly.

The following check items, as well as the frequency and working hours, are based on Chinese experience and are provided for reference. Overseas regions can adjust them according to local requirements and actual conditions.

Items	Frequency	Working hours	Remark
Site check	Every year/ time	10min/site	
Appearance check		10min/unit	
Functional check		10min/unit	
Internal check		15min/unit	
Cleaning		20min/unit	

Table 7-1 Prevention maintenance

7.2.1 Site check

Requirements: It is necessary to identify the dangerous source of the charging site, and report the hidden safety hazard.

Working hours: 10min/ site.

Frequency: Every year.

Check Items	Content and Specification	Check Method	Conclusion	Remark
Site Check	There is charging procedure information.	Visual	□ Pass □ Fail	
	CCTV camera works normally.	Visual	□ Pass □ Fail	
	Equipped with fire extinguishers and other safety facilities. Safety facilities are available.	Visual	□ Pass □ Fail	
	Equipped with parking bars.	Visual	□ Pass □ Fail	
	No flammable, explosive, and something dangerous around.	Visual	□ Pass □ Fail	
	The surrounding of the site is suitable (no dust, oil, and weeds).	Visual	□ Pass □ Fail	
	The canopy is not damaged.	Visual	□ Pass □ Fail	
	Check that the terrain is leveled, not around flood discharge point.	Visual	□ Pass □ Fail	
EVSE Check	The surface of the EVSE is flat and smooth, without obvious mechanical damage or deformation.	Visual	□ Pass □ Fail	
	Warning symbols and electrical hazard signs are complete and clear.	Visual	□ Pass □ Fail	
	The nameplate is complete, correct, and firm.	Visual	□ Pass □ Fail	
	Cannot open the door after the door is closed and locked.	Visual	□ Pass □ Fail	
	The EVSE is placed properly on the foundation, and there are no bolts lost or loose.	Visual	□ Pass □ Fail	
	Electrical schematic diagram, qualification certificate, factory inspection report, key.	Visual	□ Pass □ Fail	
	Every breaker's label represents its respective charger	Visual	□ Pass □ Fail	
	The breakers work normally.	Visual	□ Pass □ Fail	

	Content and Specification	Check Method	Conclusion	Remark
	The power cable is not damaged.	Visual	□ Pass □ Fail	
	The wiring is not loose.	Visual	□ Pass □ Fail	
	Verification of meter data.	Visual	□ Pass □ Fail	
	Check the internal exposed three-phase copper bar protection.	Visual	□ Pass □ Fail	
	Not soaked in water after heavy rain or typhoon.	Visual	□ Pass □ Fail	

Table 7-2 Site check

7.2.2 Appearance check

Requirements: EVSE should be turned off.

Working hours: 10min/ unit.

Frequency: Every year.

Check Items	Content and Specification	Check Method	Conclusion	Remark
Appearance check	All components of the EVSE are free from stains, scratches, and deformations.	Visual	□ Pass □ Fail	
	Nameplate and other signage including safety warning signs are accurate, clear, and complete	Visual	□ Pass □ Fail	
	Charging cable is complete without damage. No water or dust in the charging connector. The insulation cap is complete	Visual	□ Pass □ Fail	
	LED indicators work normally	Visual	□ Pass □ Fail	
	Emergency stop button ought not to be pressed	Visual/Manual	□ Pass □ Fail	
	Touchscreen is not damaged	Visual	□ Pass □ Fail	

Table 7-3 Appearance check

7.2.3 Internal check

Requirements: EVSE should be turned off.

Working hours: 20min/unit.

Frequency: Every year.

Check Items	Content and Specification	Check Method	Conclusion	Remark
Internal check	Door works normally. The inner components of EVSE should be free of liquid stains, leakages, rust as well as no signs of physical damages.	Visual/Manual	□ Pass □ Fail	
	Input and communication terminals in the EVSE are tightened and free from signs of burns.	Visual/Manual	□ Pass □ Fail	
	PE wires of the EVSE are reliable with no signs of damage and rust.	Visual/Manual	□ Pass □ Fail	
	L1, L2, L3, N, and PE are clearly marked, and the wiring is reliable and in good contact.	Visual/Manual	□ Pass □ Fail	
	Measure the three-phase input voltage.	Measurement	□ Pass □ Fail	
	No short circuit is present between the DC+ and DC- of the input of the charging cable. No short circuit is present between the DC+ and DC- of the output of the charging cable.	Measurement	□ Pass □ Fail	
	No short circuit is present between the DC+ of the input of charging cable and DC+ of the input of charging cable. No short circuit is present between the DC- of the input of charging cable and DC- of the input of charging cable.	Measurement	□ Pass □ Fail	
	There should be no reverse connection in DC+/DC- of the input/output of charging cable.	Measurement/ Visual	□ Pass □ Fail	
	Ensure fireproof material at the bottom is sealed and intact	Visual	□ Pass □ Fail	
	Ensure the wiring connections of the AC input main circuit and their screws are tightened properly (such as AC input terminal connector, MCCB, AC contactor, leakage circuit breaker, junction box or terminal, PE wiring and its screws, etc.). If any screw or connection is found loose, a screwdriver must be used to tighten it.	Visual/Manual/ Measurement	□ Pass □ Fail	

	Content and Specification	Check Method	Conclusion	Remark
	Ensure screw and wire connections for DC output circuit, and circuit contact points of various components are tight and in contact (such as power module, PDU output copper wire, DC circuit relay, fuse, charging gun DC terminal, PE wiring, copper plate screw, etc.). If any screw or connection is found loose, a screwdriver must be used to tighten it.	Visual/Manual/ Measurement	□ Pass □ Fail	
	Ensure the cotton filter is free of accumulation of particulates and foreign material, and not damaged. Else, replace it.	Visual	□ Pass □ Fail	
	Ensure fans in power modules are clean and the power modules are installed with screws firmly.	Visual	□ Pass □ Fail	
	Ensure the trip function on both RCCB is normal after pressing test button.	Manual	□ Pass □ Fail	
	Ensure the power module sockets are in the normal condition without any damage.	Visual	□ Pass □ Fail	
	Ensure the power modules are not missing and are not in an alerted state.	Visual	□ Pass □ Fail	

Table 7-4 Internal check

7.2.4 Functional check

Requirements: EVSE should be turned on.

Working hours: 15min/unit.

Frequency: Every year.

Check Items	Content and Specification	Check Method	Conclusion	Remark
Functional check	Start the charging and ensure charging data is properly reflected on the interface	Visual	□ Pass □ Fail	
	During charging, ensure the LED indicators work normally.	Visual	□ Pass □ Fail	
	Charging details such as SOC, charging voltage and current, etc. displayed on the charger screen is consistent with the App.	Visual	□ Pass □ Fail	
	Ensure display on the charger screen is easily readable with no signs of cloudiness. The operations and interface should also be smooth and friendly.	Visual	□ Pass □ Fail	
	During charging, opening the door should immediately stop the charge automatically and display a warning at the screen.	Visual	□ Pass □ Fail	
	During charging, pressing the emergency stop should immediately stop the charge automatically and display a warning at the screen.	Visual	□ Pass □ Fail	
	During charging, move the angle switch board should immediately stop the charge automatically and display a warning at the screen.	Visual	□ Pass □ Fail	
	Setting the upper temperature threshold to below the ambient temperature will result in the charging process to not initiate at all.	Visual	□ Pass □ Fail	
	Ensure that all power modules are working properly where the status and temperature are reflected accordingly.	Visual	□ Pass □ Fail	

Table 7-5 Functional check

7.2.5 Cleaning

Working hours: 20min/unit

Frequency: Every year

Content and Specification	Check Method	Conclusion	Remark
Filter mats/Dustproof cotton	Replacement	□ Pass □ Fail	

Table 7-6 Cleaning

- **For inlet filter mats**

(1) Power off the EVSE.

(2) Open the door of the EVSE.

(3) Move the clips and open the air windows. If it is hard to move the clip, loosen the screws to make it easier to move the clip.



Figure 7-1 Remove the clips and loosen the screws

(4) Carefully pull and remove the old filter mats, then install the new filter mats with the side without steel wire facing outside.



Figure 7-2 Replace the filter mats

(5) Tighten the screws and clips, and close the front doors of the EVSE.

(6) Power on the EVSE.

- **For outlet filter mats**

(1) Power off the EVSE.

(2) Open the door of the EVSE.

(3) Check the status of the fans in advance, if there is damage, replace the fan.

7.2.6 Charging test

Once you have completed all of the required checks above, refer to the user manual and do the following steps:

(1) Use the designated app or scan the QR code, or swipe the card to start the charging process.

(2) Let the charging process continue for at least 10 minutes.

(3) If the charging process is successful, then your EVSE is working properly. If you have any problems, please contact the manufacturer or a qualified technician.

EV Model	CPID	Required Voltage (V)	Required Voltage (A)	Output voltage (V)	Output current (A)	Conclusion
						Pass □ Fail □
						Pass □ Fail □
						Pass □ Fail □
						Pass □ Fail □
						Pass □ Fail □
						Pass □ Fail □
						Pass □ Fail □
						Pass □ Fail □
						Pass □ Fail □
						Pass □ Fail □
						Pass □ Fail □

Table 7-7 Charging test

8 Technical specifications

8.1 Technical data

8.1.1 General parameters

Product brand	Acrel
Product name	AEU160
Product models	AEU160-80*, AEU160-120*, AEU160-160*

8.1.2 Input parameters and grid parameters

Rated input voltage	400V/3P+N+PE , 50/60 Hz
Input current	Rated at 245A
Power factor	≥0.99 @ Full Load
Total harmonic current	≤5%
Peak Efficiency	97%

8.1.3 Output parameters

Output interface	CCS2
Output current	A: DC 250A rated/300A boost@10min B: DC 250A rated/300A boost@10min
Output voltage	150V to 1000Vdc
Output power	Max 160kW

8.1.4 Environmental parameters

Operating temperature	-30℃ to 55℃ (derating above 50℃)
Storage temperature	-40℃ to 70℃
Humidity	5% to 95% RH
Altitude	≤2000m
Dust level	≤1 mg/m^3
Corrosive substance	No pollutants, such as salt, acid, smoke, etc.
Vibration	≤1.5mm/s^2
Insects, pests, vermin, termites	None
Mold	None
Moisture	Rain prevention
Fire prevention	Do not stack flammable and explosive substances around

8.1.5 Communication parameters

Network interface	4G / Wi-Fi/ Ethernet
Antenna	Outdoor Antenna for Wireless Port Ready
Ethernet	10/100 Base-T Ethernet Enable to set IP Static Configuration Enable to set DHCP Configuration
Communication protocol	OCPP 1.6J , ISO 15118 , DIN 70121

8.1.6 User Interface & control

Display screen	7-inch LCD touch screen
Language support	Standard English, Other languages available upon request
Mechanical button	Emergency stop button
RFID	ISO/IEC 14443A/B ISO/IEC 15693 FeliCa TM 1 NFC reader mode Mifare Calypso
Start method	QR code/RFID card/Auto charge

8.1.7 Mechanical parameters

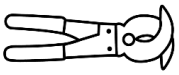
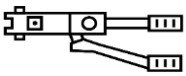
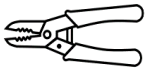
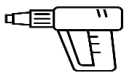
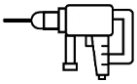
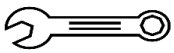
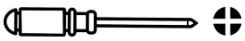
Protection level	IP55/IK10 (IK08 screen)
Cooling method	Forced air cooling
Dimensions (W×H×D)	Dimensions: 800×1700×500mm (without connector holders and cable management system)
Weight	• Approx. 280kg (without power modules and cable management system) • Approx. 17kg per power module • Approx. 8kg per CMS

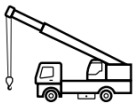
8.1.8 Operating frequency

	Band	TX (MHz)	RX (MHz)	EIRP (dBm) (MAX.)
Wi-Fi	Wi-Fi 2.4G	2412 to 2472	2412 to 2472	15.56
4G modules EC200A	E-GSM900	880 to 915	925 to 960	32.75
	DCS1800	1710 to 1785	1805 to 1880	29.80
	WCDMA BAND Ⅰ	1920 to 1980	2110 to 2170	24.37
	WCDMA BAND V	824 to 849	869 to 894	24.13
	WCDMA BAND Ⅷ	880 to 915	925 to 960	24.07
	LTE B1	1920 to 1980	2110 to 2170	23.51
	LTE B3	1710 to 1785	1805 to 1880	23.55
	LTE B5	824 to 849	869 to 894	23.54
	LTE B7	2500 to 2570	2620 to 2690	23.50
	LTE B8	880 to 915	925 to 960	23.91
	LTE B20	832 to 862	791 to 821	23.88
	LTE B28	703 to 748	758 to 803	23.59
	LTE B38	2570 to 2620	2570 to 2620	23.51
	LTE B40	2300 to 2400	2300 to 2400	23.18

8.2 Required tools

8.2.1 Required tools for installation

Category	Name	Usage	Picture
Cable preparation tool	Electrician knife	Stripping of insulating sheath	
	Cable cutter	Cable cutting	
	Hydraulic tongs	Terminal crimping	
	Wire stripping pliers	Stripping of insulating sheath	
	Hot air gun	Thermal shrinkage of insulating materials	
	Network cable pliers	Crimping of RJ45 connector	
Installation tool	Percussion drill	Drilling hole	
	Open-end wrench (full set)	Installing and removing nuts	
	Cross screwdriver (PH2)	Installing and removing screws	
Installation tool	Torx screwdriver (full set)	Installing and removing screws	
	Hammer	Knocking	
Measurement tool	Spirit level	Horizontal measurement	
	Tape measure	Distance measurement	
	Multimeter	Measurement of voltage, current, etc.	
	Megger	Measurement of resistance	

Category	Name	Usage	Picture
Marking tool	Maker pen	Position making	
Handling tool	Fork lift	Equipment handling	
Hoisting tool	Crane	Equipment hoisting	

8.2.2 Required tools for commission

Name	Usage	Picture
Laptop	Configure the settings and read logs	
Ethernet cable	Web configuration	
J – LINK tool	Programming	
5/6 pin adaptor and flat cable		
Micro SD Card and reader		
Screwdriver set	Assemble and disassemble the screws	
Wrench set	Standby	
Electrical multi-meter	Electric measurement	
Megohmmeter	Test the insulation	
Safety Sign	Warn potential danger on site	
Electrician protective gloves	Safety protection	
Electrician protective Shoes		

8.2.3 Bolts recommended Torque reference sheet

Component	Bolt Specifications	Torque Range(Unit: N·m)	Recommended Torque (Unit: N·m)
Input copper bar (L1, L2 L3, N, PE)	M10	17.7-22.6	20.0
MCCB	M8	8.8-10.8	10.0
AC contactor	M10	17.7-22.6	20.0
MCB	M4	1.35-1.65	NA
Power module input wire terminal	M6	4.0-4.9	4.5
Power module output wire terminal	M6	4.0-4.9	4.5
DC contactor of power distribution	M5	2.20-2.80	NA
DC contactor of DC output circuit	M5	2.20-2.80	NA
Fuse	M10	17.7-22.6	20
Shunt	M10	17.7-22.6	20
Charging plug	M10	17.7-22.6	20
CMS lifting bolt	M12	31.4-39.2	36
Bottom front/back sealing plate	M5	2.20-2.80	NA
CMS swing arm sealing plate bolt	M6	4.0-4.9	4.5
Power module slot bottom securing bolt	M6	4.0-4.9	4.5
Power module securing screw	M4	1.35-1.65	NA
AC power cable incoming plate	M5	2.20-2.80	NA
Input copper bar (L1, L2 L3, N, PE)	M8	8.8-10.8	10

8.3 Error codes

You can quickly identify different types of errors and anomalies that occur in your software, system, or device based on the following error codes table to help you locate and resolve problems more accurately.

Error Code	Description	Solution
0x000000	NoError	There are no errors to report.
0x100003	Sensor communication failure	Check sensor wiring
0x100005	Card reader communication failure	Check if the card reader communication line is normal
0x100006	Reset failed (hardware, software)	Configure the charger again
0x100007	Insulation warning	Check the insulation monitoring board
0x100008	WeakSignal	The wireless communication device reports a weak signal.
0x100009	Terminal SD card fault	Check whether the terminal control board is faulty or replace the SD card of the terminal
0x10000C	SECC socket connection warning	Check SECC network wiring harness connections
0x100012	Communication failure of top light belt	Check top light belt
0x100013	Cable joint temperature difference alarm	The output power of the charger will decrease
0x100101	Over-temperature fault inside the terminal	The output power of the charger will decrease
0x100102	Cable connector over temperature alarm	Check the cable connector
0x100106	Positive contact sensor short	Check the positive contact sensor
0x100107	Negative contact sensor short	Check the negative contact sensor
0x100108	Positive contact sensor open	Check the positive contact sensor
0x100109	Negative contact sensor open	Check the negative contact sensor
0x10010A	Positive contact temperature mutation	Check the positive contact sensor

0x10010B	Negative contact temperature mutation	Check the negative contact sensor
0x10010C	Contact temperature mutation	Check the positive/negative contact sensor
Error Code	**Description**	**Solution**
0x100200	DTC_INTETNEL_ERROR	Damage tofirmware orerrors in components, hardware (CPU,memory, RTC devices, electrical hardware etc.)
0x100202	Terminal emergency stop is pressed	Reset terminal emergency stop button
0x100206	Ground Fault	Check the line
0x100207	Insulation monitoring board failure (communication, hardware)	Replace the board or reprogram
0x100208	Output relay control failure	Connect the relay again and replace the new relay
0x10020A	Insulation fault	Please check the vehicle
0x10020D	High humidity alarm	Check if the local humidity exceeds the standard
0x10020F	Meter failure (communication, data error)	Check whether the communication line of the meter is normal
0x100210	Communication fault with the subboard	Check whether the communication line between the mainboard and the subboard is normal
0x100211	Power failure	Check the incoming power
0x100212	Abnormal communication with the rectifier cabinet	Check the line
0x100213	Overcurrent fault	Check whether the vehicle end is faulty
0x100214	Output overvoltage fault	Check power modules/input AC
0x100216	SECC board offline	Check the PLC board connection or fault
0x100219	EVCommunicationError	Communication failure with the vehicle, can occur inMode3 or other communication protocols. This is not an error that causescharge pointenter statusfaulted. Instead, it

		should enter SuspendedEVSE status.
0x200001	Power module communication failure	Communication recovered
0x200002	Power module alarm and failure	Check the power module and replace the broken one
0x200003	PDU relay control failure	Reboot or replace the PDU
0x200004	PDU communication failure	Re-plug the port or reboot the charger
0x200007	Abnormal external storage of power cabinet	Check whether the TF card or terminal control board is faulty
0x200008	Input surge protection alarm	Check the input surge protection
0x200101	Module DC is over temperature	Temperature back normal and reboot
Error Code	**Description**	**Solution**
0x200104	Power control fan failure (alarm)	Check the fan
0x200105	Power cabinet over temperature alarm	Check the power module
0x200201	Abnormal power control output	Re-program or replace the PDU board
0x200202	Emergency stop failure	Reset the button
0x200203	Liquid level alarm	Check if charger is immersed in water
0x200204	Door open	Close the door or disable the door sensor
0x200206	Input overvoltage fault	Check the input voltage of the charger
0x200207	Input relay control failure	Check if the input relay control line is normal
0x200208	Input undervoltage fault	Check the input voltage at the charger end
0x200209	Circuit Breaker Tripped	Check Circuit breaker
0x20020B	Impact warning	Check angle transducer
0x20020C	Fusing warning	Check the continuity of the fuse or replace a new fuse
0x20020D	Smoke Warning	Check smoke transducer

0x20020E	Communication failure of all power modules	Check whether the power module is installed in place or damaged
0x200211	Mixed insertion of different power modules	Check power module type
StopReason Code	**Description**	**Solution**
0xA00004	REASON_EMERGENCYSTOP	Press the emergency stop button during charging to stop it.
0xA00005	REASON_METER_COMERR	During the charging process, the communication of the electricity meter malfunctioned.
0xA00007	REASON_CARDREADER_ERR	The connection failure between the card reader and the motherboard
0xA00008	REASON_GROUND_FAILURE	Ground fault
0xA00009	REASON_OVER_TEMP	The gun is overheated.
0xA0000A	REASON_INSULATION_FAILURE	insulation fault
0xA0000B	REASON_METER_DATA_ERR	There is an abnormality in the electricity meter data.
0xA0000C	REASON_DOOR	Door open
0xA0000D	REASON_RELAY_ERR	The relay does not operate as expected.
0xA0000E	REASON_LOCK_FAILURE	ConnectorLockFailure
0xA00010	REASON_INSULATION_COMERR	Insulation detection board and base plate have abnormal communication.
0xA00012	REASON_SUBBOARD_OFFLINE	Secondary control panel offline
0xA00013	REASON_DISCHARGE_OVERTIME	Did not release within the specified time limit
0xA00014	REASON_FAKEPRECHARGE_OVERTIME	During the pre-charging stage, the specified voltage was not reached.
0xA00015	REASON_SURGE	Surge fault feedback
0xA00016	REASON_PLCBOARD_OFFLINE	Communication failure between the secc and the base plate

0xA00017	REASON_SLANT_WARN	Pile tip collapse fault
0xA00018	REASON_WATERLEVEL_WARN	Pile end liquid level failure
0xA00020	REASON_OUTPUTRELAY_CTRLERR	Output relay control failure
0xA00023	REASON_BREAKER_OPEN	Breakrer open failure
0xA00101	REASON_EV_DISCONNECTED	The gun connection has been disconnected.
0xA00102	REASON_EV_ERR	Car communication failure
0xA00103	REASON_EV_PARAGET_OVERTIME	Interaction timeout between the vehicle and the pile end parameters
0xA00105	REASON_PARAMETERS_NOT_MATCHING	During the charging process, the charging parameters do not match.
0xA00106	REASON_EV_CHARGE_COMPLETE	The car has completed charging.
0xA00107	REASON_CHARGINGPOWER_IS_REACHED	The car has reached the specified charging capacity and the charging process is complete.
0xA00108	REASON_CHARGINGTIME_IS_REACHED	The car has completed charging at the designated time.
0xA00110	REASON_EV_SLAC_OVERTIME	SLAC overtime
0xA00202	OtherError	Other damage or disturbance
0xA00207	REASON_OVER_VOL	Over vol failure
0xA00208	REASON_UNDER_VOL	Under vol failure
0xA00209	REASON_OVER_CUR	Over cur failure
0xA0020A	LocalListConflict	Authorization information received fromcentral systemon the contrary toLocalAuthorizationList.
0xA0020D	REASON_EVSE_POWER_ALLOC_OVERTIME	Power allocation timeout
0xA00210	REASON_CABLE_REVERSE_ERR	Cable reverse connection fault

0xA00213	REASON_DISPENSER_SD_CARD_FAULT	SD card error

8.4 FAQ

8.4.1 Input under-voltage fault

Phenomenon: "Input under-voltage" is shown on the display.

Analysis:

- The input voltage is under 400V-15%.
- The power module is broken.

Solution:

(1) Measure the input voltage of the EVSE, if abnormal, contact the installation team.

(2) Monitor whether there are any errors with the power modules during charging. If so, try to replace them.

8.4.2 Input over-voltage fault

Phenomenon: "Input over-voltage" is shown on the display.

Analysis:

- The input voltage is over 400V+15%.
- The power module is broken.

Solution:

(1) Measure the input voltage of the EVSE, if abnormal, contact the installation team.

(2) Monitor whether there are any errors with the power modules during charging. If so, try to replace them.

8.4.3 Insulation fault

Phenomenon: "Insulation fault" is shown on the display.

Analysis:

(1) There is something wrong with the charging connector.

(2) The circuit is abnormal.

(3) The insulation monitoring device is broken.

(4) The power module is broken.

Solution:

(1) Check whether there is water, stone, or something inside the charging connector. If so, clean or dry it.

(2) Measure the insulation resistance of the input power cable and the charging connector as the steps during commissioning. Correct the components with issue.

(3) Check the wiring of the insulation monitoring device.

8.5 Compliance and standard adhered to

8.5.1 Certification

Certificates: CE/CB

8.5.2 Safety standards

The following documents are the design standards for this product:

EN 300 328 V2.2.2,
EN 300 330 V2.1.1
EN 301 511 V12.5
EN 301 908-13 V13.2.1
EN 301 908-2 V13.1.1
EN 301 908-1 V15.2.1
EN 301 489-1 V2.2.3
EN 301 489-3 V2.3.2
EN 301 489-17 V3.2.4
EN 301 489-52 V1.2.1

EN IEC 62311: 2020
EN IEC 61851-21-2:2021
EN IEC 61851-1:2019
EN 61851-23:2014
EN 61851-24:2014
EN IEC 61000-6-2:2019
EN IEC 61000-6-4:2019
IEC 61851-1:2010(ed.2)
IEC 61851-23:2014

Customer service

Preparation:

If you have any questions or problems, please contact the company responsible for performing the electrical installation.

Before contacting Customer Service:

Check the troubleshooting section in the manual.

