



Star Charge[®]
星星充电

Charging Infrastructure
Venus 30 Maintenance Manual

Legal Statement

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1 Purpose

In order to ensure the safe, stable and efficient operation of the charging stations, timely troubleshoot faults and other abnormal problems, and put forward relevant operational specifications for on-site operation and maintenance personnel, this manual is specially formulated.

2 Scope of application

It is applicable to the maintenance of Venus30 series charging stations.

3 Personnel requirements

2.1 Safety Requirements

- 1) Operators should master electrical safety knowledge, understand the principle and performance of charging stations, as well as master the first aid and emergency handling measures for electric shock, so as to be able to find and deal with various possible emergency situations during field debugging.
- 2) When operating on-site, operators must be clear-headed, focused, and not drunk or screaming. Those who are unwell are not allowed to work.
- 3) During the operation, operators must wear insulating shoes and insulating gloves. If necessary, operators should wear a safety helmet and other protective equipment. All used insulating appliances, instruments and tools must be checked in good condition and reliable.
- 4) Any electrical equipment or line shall be deemed to be energized before being checked and shall not be touched. When contact operation is required, the superior power supply should be cut off, and the power should be checked again after experiencing electricity and discharging (capacitive facilities), and the power switch handle should be hanged with a sign of "No closing, operator is working" or other measures should be taken to prevent false closing before contact operation.
- 5) Before operation, the superior power supply must be cut off, and the lockout and tag out procedures must be strictly implemented.
- 6) If possible, try to work without power. If electric operation is required, special supervision must be provided. The supervision shall meet the requirements of the profession, and shall not engage in operations or do anything unrelated to the guardianship during guarding.
- 7) When working with electricity, you should first distinguish between L, N, and PE, and choose the working position. Do not touch the conductive part and the zero (ground) part at the same time when working.

- 8) Without permission and approval, the original wiring method and structure in the charging stations shall not be changed.
- 9) After the work is finished, the components shall be restored to their original state, the tools shall be checked to prevent omissions, and the site shall be cleaned and sorted out.
- 10) In case of a safety accident, the emergency plan for production safety shall be activated immediately, and report to relevant person in charge according to the requirements of the plan at once, and carry out on-site emergency treatment at the first time, control the spread and expansion of the accident, and rescue personnel and property in accordance with the emergency plan.
- 11) In case of personal electric shock, cut off the superior power supply immediately and carry out emergency rescue according to the emergency rescue method. At the same time, call the local emergency number for professional help and report to the superior leader, and make a good record.
- 12) Power transmission sequence: high voltage power supply side, low voltage inlet and outlet line side, load (box transformer → power distribution cabinet → station).
Power transmission sequence: high voltage power supply side, low voltage inlet and outlet line side, load (box transformer → power distribution cabinet → station).

2.2 General requirements

- 1) Charging station operation and maintenance managers must receive safety production education and job skills training, and take up their posts after passing the assessment.
- 2) Charging station operation and maintenance managers must operate in accordance with the operating procedures and job specifications.
- 3) Charging station operation and maintenance managers must wear uniform clothes and work cards
- 4) Charging station operation and maintenance managers must be responsible for the work they are engaged in, fulfill their service promises, and use civilized language when serving customers.

2.3 Job Responsibilities

- 1) The operation and maintenance personnel of the charging station are responsible for the operation and maintenance of the charging facilities, handle the faults of the charging facilities and maintain the charging facilities.
- 2) The operation and maintenance personnel of the charging station are responsible for the safety of the charging station, improve the safety system of the charging station, conduct periodic safety inspections, supervise and report the safety of the charging station.

2.4 Job skill requirements

- 1) The operation and maintenance personnel of charging equipment must master the charging principle of electric vehicles, the working principle of charging facilities, common troubleshooting methods, maintenance methods of charging facilities, emergency treatment methods and safety knowledge.
- 2) The operation and maintenance personnel of charging equipment must understand the relevant national rules and regulations for safe production, master the knowledge of charging safety and emergency handling methods for accidents.

4 Inspection and maintenance service

4.1 Site inspection

Illustration:

The following inspection items are based on Chinese requirements, as well as the frequency and working hours are based on Chinese experience. The overseas regions can adjust according to local requirements and actual conditions.

Requirements:

It is necessary to identify the dangerous source of the charging station site, and report the hidden safety hazard to the place for treatment in time.

Working hours: 10min/unit

Frequency: every quarter/time

Check Item	Content and specification	Check Method	Conclusion	Remark
Station group check	There are charging steps.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	The monitoring and storage functions of the site monitoring facilities are normal.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	Equipped with fire extinguishers and other safety facilities, and safety facilities are available.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	Equipped with a car block.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	No flammable, explosive and other dangerous goods around each station and station group.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	The surrounding environment of the station group is good (no dust, oil, humidity, weeds).	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	Check that the charging station canopy is not damaged.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	Check that the terrain is not low-lying and not around the flood discharge channel.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
Power distribution Cabinet check	The surface of the cabinet (box) is flat and smooth, without obvious mechanical damage or deformation.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	

	Lightning warning symbols and electrical hazard words are complete, clear.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	The nameplate is complete, correct and firm.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	Door lock test: after the door is closed and locked, it cannot be loosened.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	The shell and the foundation are fastened reliably, and there is no leakage or loosening of bolts.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	Electrical schematic diagram, qualification certificate, factory inspection report, key.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	Each leakage protection switch corresponding to the charging station number is clearly marked.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	The circuit breaker status is normal.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	The power cable is not broken.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	The wiring is not loose.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	Verify meter data.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	Check the internal exposed three-phase copper bar protection.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	Not soaked by rainwater after heavy rain or typhoon.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	

4.2 Appearance inspection

Requirements: clean the outer surface of the charging stations, such as dust, small advertisement, and foreign matter, including charging gun with its wires, and ensure that the appearance of the stations is clean and without damage.

Working hours: 10min/unit

Frequency: every quarter/time

Check Item	Content and specification	Check Method	Conclusion	Remark
Appearance inspection	The appearance of the equipment components has no paint, scratches,	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	

	abrasions, deformations and other damages (the QR code has no fading, peeling, or scratches).			
	The equipment's nameplate and other identification signs are correct, clear and complete, and safety warning signs are posted in place.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	The flange of the gun wire inlet does not fall off, the gun tip is not obviously damaged, there is no residual water or sand inside the gun tip, and the gun tip insulation cap does not fall off	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	The device indicator is normal.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	The emergency stop of the equipment is not pressed.	Visual / touch	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	

4.3 Equipment internal inspection

Working time: 20min/unit

Frequency: every six months/time

Check Item	Content and specification	Check Method	Conclusion	Remark
Internal inspection	Check the function of the door, and the lock lever is good, and the cabinet door is locked normally; Open the cabinet door, no water stains (coolant or abnormal condensation, etc.), no water leakage, no rust on the screws, and the sealing strip surrounds the door frame without falling off or damage.	Visual / touch	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	There is no looseness and blackening of the incoming wire terminal and the communication wire terminal.	Visual / touch	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	The cabinet column and ground wire are	Visual / touch	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	

	connected reliably, without breakage or corrosion.			
	The L1, L2, L3, N, and PE lines have obvious signs, and the wiring is reliable and in good contact.	Visual / touch	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	Measure three-phase incoming line voltage.	Measurement	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	There is no short circuit between the positive and negative terminals of the output gun and between the positive and negative terminals of the output terminal.	Measurement	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	The positive and negative cables of the DC output gun wire are routed from the output gun wire terminal to the positive and negative poles of the gun head, and there is no open circuit in the core of the gun.	Measurement	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	The positive and negative cables of the DC output gun wire end correspond to the positive and negative copper bars at the output end of the station end, no reverse connection.	Measurement /Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	The dustproof cotton has no dust accumulation, and the air inlet filter is not damaged. In the case of serious ash accumulation or damage, directly replace the air inlet and outlet filter cotton.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	Clean and check the fan and interface of the power module, and tighten the fixing screws on the front of the power module.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	The bottom of the fireproof material is completely sealed without collapse	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	

	Check the end of the power module, the pins and pins are not damaged, burnt, or arced.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	Check that the power module in the station is not missing and the module has no alarm.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	

4.4 Insulation inspection

Requirements:

Turn off the power supply before measurement, pull out the module to separate it from the tail plug, remove the ground wire of the surge protector, remove the insulation detection board DC+, DC-, and test one by one.

Working time: 15min/unit

Frequency: every six months/time

Check Item	Content and specification	Check Method	Conclusion	Remark
Insulation resistance	The insulation resistance value of the copper bar at the bottom of the DC+ relay to PE is not less than 1MΩ, and the insulation resistance value is recorded	Measurement	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	The resistance of the copper bar at the bottom of the DC- relay to PE insulation is not less than 1MΩ, and the insulation resistance is recorded	Measurement	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	The insulation resistance value of the lower copper bar of the DC+ relay to the lower copper bar of the DC- relay is not less than 1MΩ, and the insulation resistance value shall be recorded.	Measurement	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	The insulation resistance of the input terminals L1/L2/L3 to PE is not less than 10MΩ, and the insulation resistance value is recorded.	Measurement	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	

4.5 Charging function check

Requirements: Check that if the various functions of the charging equipment are normal and meet the technical requirements when charging.

Working hours: 15min/unit

Frequency: every quarter / time

Check Item	Content and specification	Check Method	Conclusion	Remark
Function check	Start the charging station and read the charging data.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	After the charging station is running , the indicators work normally.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	The charging details, including SOC , charging voltage, charging current, power, etc. displayed on the screen during charging are consistent with the APP (platform) record.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	The display is normal, without obvious snowflake highlights, and the writing is clearly displayed; the operation is flexible and reliable, and the interface logo is clear.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	Support the open state of the insulation detection board function, and the heartbeat of the insulation detection board is normal.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	When the device is charging, open the door of the charging cabinet, and the device should act according to the design requirements to stop charging and give an alarm on the screen.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	When the device is charging, press the emergency stop button at the front door of the charging station, the device should act according to the design requirements to stop charging and the fault light is on.	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	
	If the gun temperature threshold is set lower than the real-time read gun temperature	Visually	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	

	(ambient temperature), it will fail to enter the charging process after starting charging.			
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4.6 Cleaning and maintenance

Requirements: The foreign matter and dust of the DC inlet and outlet must be thoroughly cleaned, and the replacement of dust-proof cotton, filter and other parts must be carried out in strict accordance with the operating rules.

Working hours: 20min/unit

Frequency: per year/time

Check Item	Content and specification	Check Method	Conclusion	Remark
Cleaning and maintenance	Dustproof cotton / filter	replace		

4.7 Charging test

When all the check items have been tested, use the APP to scan the code or swipe the card to start, and the charging time for each charging gun is not less than 10 minutes. and record the data:

Vehicle Model	ID	Required Voltage (V)	Required Voltage (A)	Output voltage (V)	Output current (A)	Output meets the requirements
						Pass <input type="checkbox"/> Fail <input type="checkbox"/>
						Pass <input type="checkbox"/> Fail <input type="checkbox"/>
						Pass <input type="checkbox"/> Fail <input type="checkbox"/>
						Pass <input type="checkbox"/> Fail <input type="checkbox"/>
						Pass <input type="checkbox"/> Fail <input type="checkbox"/>
						Pass <input type="checkbox"/> Fail <input type="checkbox"/>
						Pass <input type="checkbox"/> Fail <input type="checkbox"/>
						Pass <input type="checkbox"/> Fail <input type="checkbox"/>
						Pass <input type="checkbox"/> Fail <input type="checkbox"/>
						Pass <input type="checkbox"/> Fail <input type="checkbox"/>
						Pass <input type="checkbox"/> Fail <input type="checkbox"/>
						Pass <input type="checkbox"/> Fail <input type="checkbox"/>

5 Equipment troubleshooting

5.1 The overall principle of the product

5.1.1 Hardware electrical principle

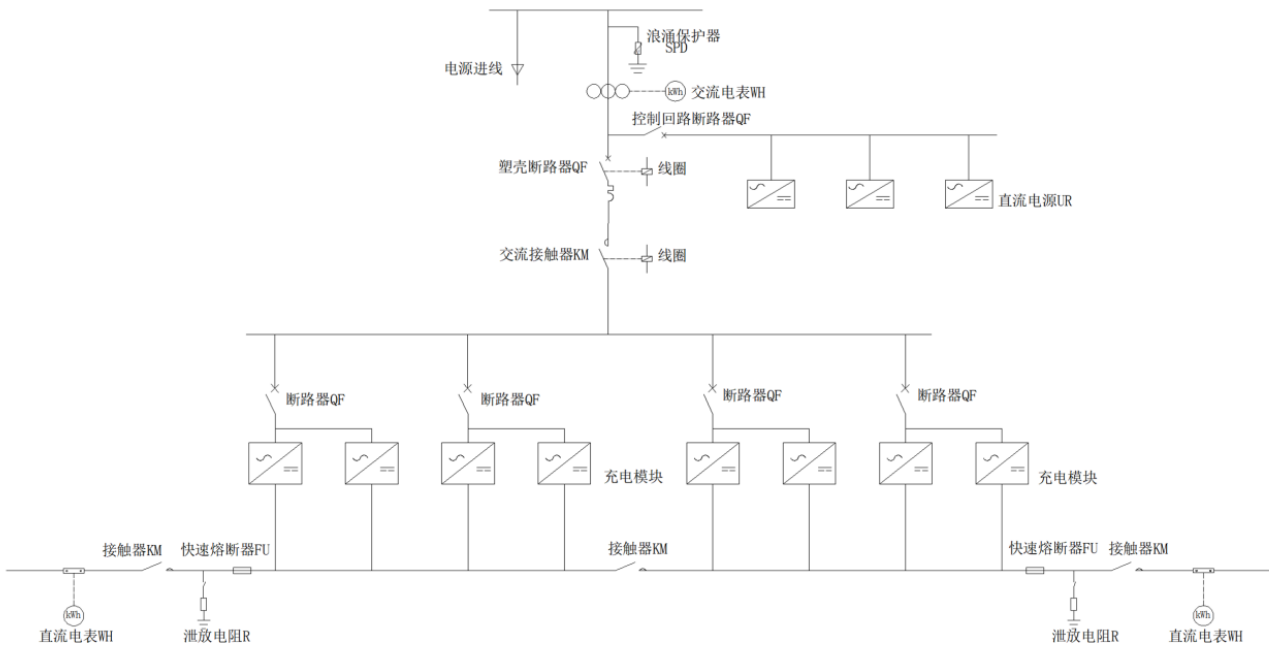


Figure 1 Schematic diagram of hardware electrical principle

5.1.2 System Control Principles

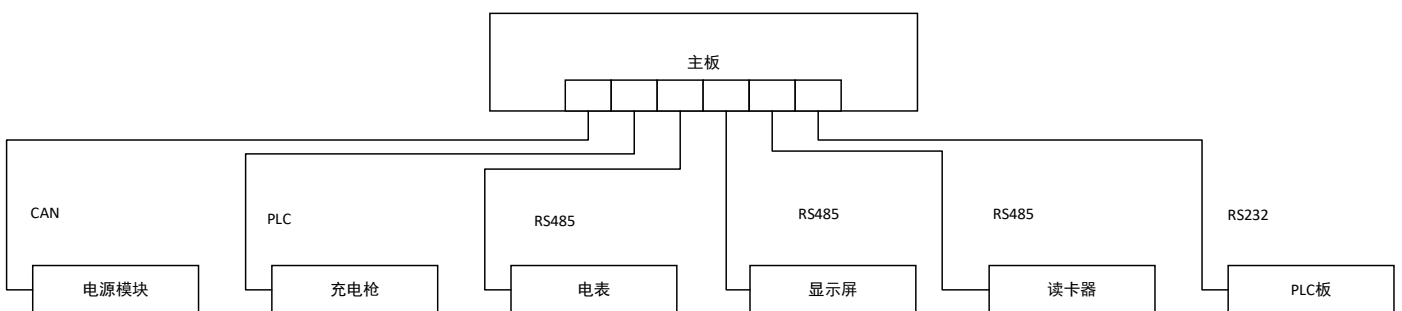


Figure 2 schematic diagram of system control

5.2 Common faults of the product

5.2.1 Air switch trip

Trouble phenomenon:

The indicator light of the charging device is off, and the whole station has no electricity.

Troubleshooting ideas:

- 1) In the case of power failure, use a multimeter to measure whether the L/N line and PE of the 230V power supply (QF2) are short-circuited and whether the line is wrong. If there is an error, correct the line.
- 2) The leakage protection switch in the station may be faulty. If the leakage current detection is inaccurate and the trip is caused, you can try to replace the leakage protection switch and then power on again.

5.2.2 The indicator light does not shine

Trouble phenomenon:

The indicator light of the charging station does not light up.

working principle:

As shown in the figure: 400V alternating current enters the charging equipment through the distribution cabinet, passes through the QF2 circuit breaker, takes 230V to the switching power supply UR1, and converts it to DC12V through the switching power supply UR1 , and supplies the components that require DC12V in the station.

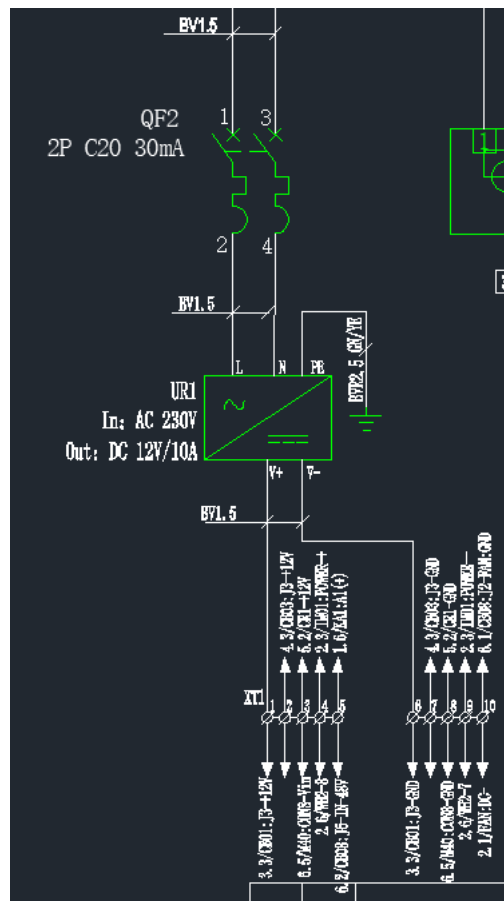


Figure 3 The electrical schematic diagram of the indicator light

Troubleshooting ideas:

- 1) Check whether the MCB in the charging device has tripped, if it trips, push the MCB to power on. If there is no trip, you need to continue to check whether the molded case circuit breaker in the superior distribution cabinet has tripped. If it trips, push the molded case circuit breaker to power on, and finally check whether the power indicator light returns to the on state.

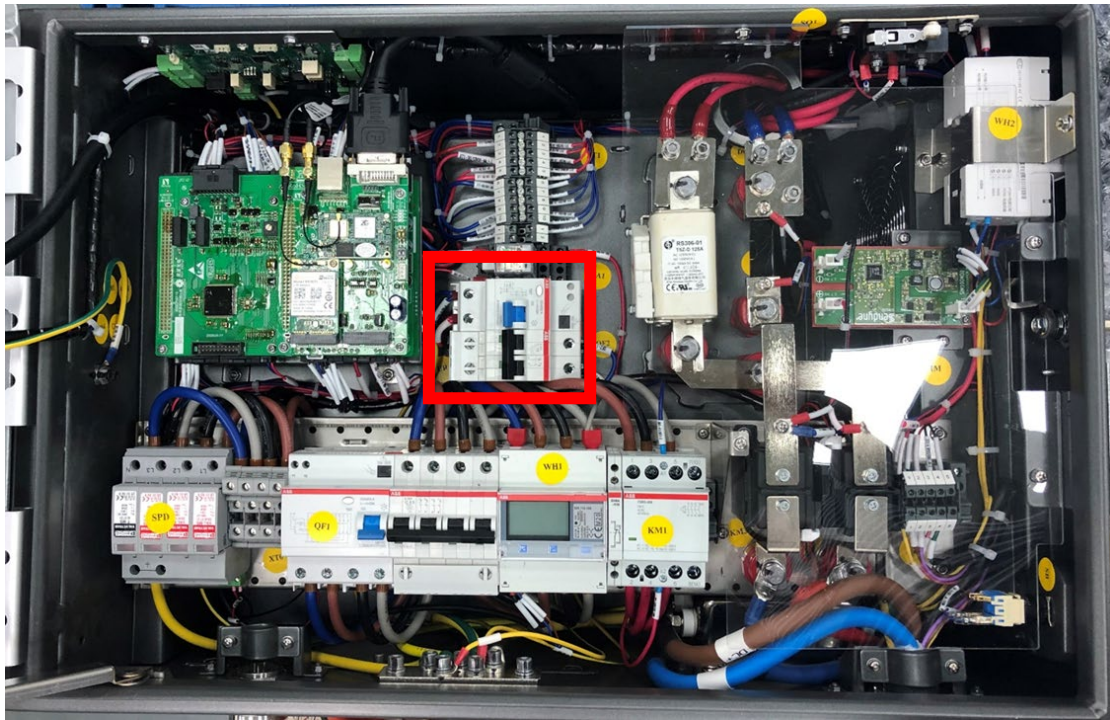


Figure 4 Schematic diagram of internal structure

- 2) If there is no tripping phenomenon found in the investigation, use a multimeter to measure whether there is 230V voltage between the upper and lower stages of the MCB in the station. If there is no voltage at the upper and lower levels, use a multimeter to measure whether the plastic case circuit breaker in the distribution cabinet has a voltage of $400V \pm 10\%$. If there is no voltage, you need to contact the local power grid personnel to find out whether the power is out of charge.
- 3) If there is no external factor, the related hardware may be faulty. First use a multimeter to measure the input terminals L and N of the 12V switching power named UR2 in the station, confirm that there is 230V voltage input, and then use the DC gear to measure whether there is 12V at the output terminal. If the voltage is not available, the switching power supply is faulty, just replace it. If the voltage is normal, use the DC gear of the multimeter to measure whether the power indicator has a 12V voltage input. If there is no 12V input, use the multimeter to measure the circuit problem with the on-off gear. There is no problem with the circuit investigation, then the power indicator is faulty and you can replace it.

5.2.3 Emergency stop button is pressed

Trouble phenomenon:

The red indicator light is always on, and the screen displays " Emergency stop button failure " .

Working principle:

The emergency stop button is controlled by the program through the main board as a whole. The indicator light is always supplied by 12V+, the com signal is connected to the main board, and no signal is given under normal conditions. When the emergency stop button is pressed, the normally open point is closed, and the signal is sent to the main board. The signal received by the main board is processed by the program. The relay of the terminal port is closed and the com signal is given to the indicator light. After 12V power, the indicator light is red. It lights up.



Figure 5 Schematic diagram of emergency stop button

Troubleshooting ideas:

Check whether the emergency stop button is pressed, turn the emergency stop button clockwise to reset it, and the fault indicator (red light) turns from red to green to indicate that it will return to normal.

5.2.4 Abnormal connection of charging gun

Trouble phenomenon:

After inserting the gun, it shows that the gun is not connected.

Troubleshooting ideas:

- 1) Check whether there is any debris in the tip of the charging gun. If there is, clean up the internal debris in time to ensure the reliability of the connection of the charging gun.
- 2) Check whether there is a path between the PLC board and the charging gun CP and PE.

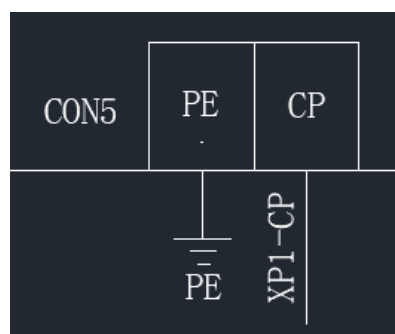


Figure 6 Schematic diagram of charging gun wiring

- 3) Check whether the 232 communication connection between the PLC board and the main board is normal.

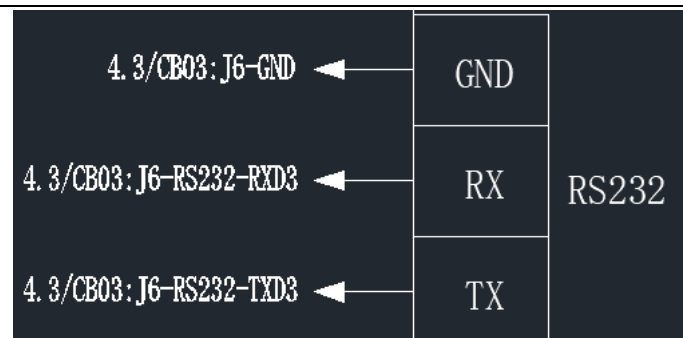


Figure 7 Schematic diagram of RS232 communication

- 4) Check whether the PLC at the end of the pile is normal, and replace the PLC board if there is unmoral.
- 5) If the PLC on the car side is dormant, contact the relevant personnel on the car side for investigation.

5.2.5 Power module failure

Trouble phenomenon:

" Power module failure " is displayed on the screen.

Working principle:

After the local power grid is connected to AC400V and passed through the circuit breaker, the current flows from the three-phase line of the socket at the end of the module to the input end of the power module.

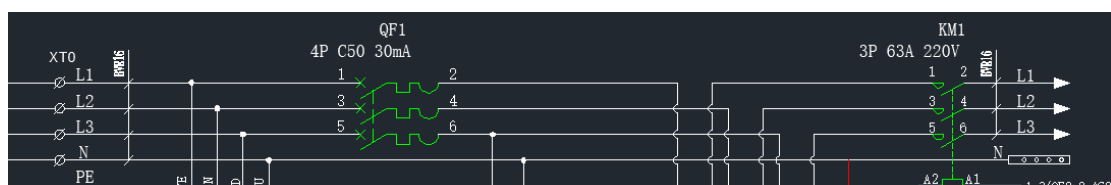


Figure 8 Input electrical schematic diagram

Troubleshooting ideas:

- 1) Check the status of the circuit breaker at the input end of the pile. If it trips, push the circuit breaker and power on.
- 2) Measure whether the voltage at the upper and lower ends of the circuit breaker is normal, and whether the voltage between the three phases is normal.
- 3) Check whether the temperature of the end socket of the power module and the tail pin of the power module is normal, whether there is any breakage, damage, or deformation. If an abnormality is found, replace the end socket of the power module or the power module.
- 4) Check whether the module CAN communication related resistance is abnormal: unplug the module CAN communication interface on the main board, use a multimeter to check whether the resistance between the module CAN line HL is about 120Ω, if there is any abnormality, correct the

circuit or replace the faulty resistance. Check whether the resistance between the CAN terminal HL of the main board is about 120Ω, if there is an abnormality, replace the main board.

- 5) Restart the charging device or re-burn the motherboard program and set the parameters.
- 6) Check the module fault indicator and panel fault code:
- 7) The module LED display panel can display the voltage, current, fault code, address, group number, communication protocol, operation mode and other information of the rectifier module. If the button is not operated for more than one minute, the output voltage of the rectifier module will be automatically displayed. If there is an alarm at this time, the fault code information will be displayed. The voltage display accuracy is $\pm 1V$, and the current display accuracy is $\pm 0.2A$.

The module protection/alarm information is displayed on the LED in the form of fault code in real time. The fault code is shown in the following table:

Fault code description table

Error code	Code meaning
E00	No trouble
E01	Output undervoltage
E02	Module ring temperature and internal temperature are over or under temperature
E03	AC input overvoltage
E04	Lack of communication
E05	Input voltage unbalance
E06	Output overvoltage
E07	Duplicate address
E08	Fan stopped
E09	Current sharing alarm

Indicator function description table

Indicator light	Name	State	Indication meaning
Green light	Power Indicator	Bright	The module works normally.
		Flashing	Communicate with monitoring or background;

			Monitor or issue DCDC shutdown commands in the background.
Yellow light	Protection indicator	Bright	Power derating due to lack of phase of input AC voltage and temperature; current sharing is abnormal. Duplicate address.
		Extinguish	Run in automatic mode and work normally.
		Flashing	Run in manual mode and work normally.
Red light	Fault Indicator	Bright	EEPROM failure ; fan drive failure; AC input overvoltage and undervoltage; internal overtemperature; Primary side and secondary side communication is not normal; output overvoltage and undervoltage; AC overvoltage separation; Output fuse is blown; AC input phase is missing;
		Extinguish	No failures occurred.
		Flashing	The fan does not turn.

5.2.6 Meter communication failure

Trouble phenomenon:

- 1) " Meter communication failure " is displayed on the screen
- 2) The communication light on the meter does not light up
- 3) The red light is always on

Working principle:

The AB interface on the 485 communication port of the main board is connected to the corresponding AB communication port on the meter for interactive message transmission.

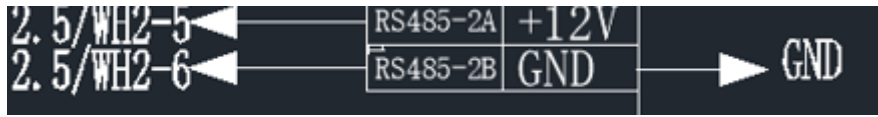


Figure 9 Schematic diagram of an electric meter

Troubleshooting ideas:

- 1) Use a multimeter to check the on/off gear of the main board 485 communication port AB corresponding to the circuit of the meter AB interface, there are open circuits, if there is an abnormality, replace the communication line or correct the bad wiring.
- 2) Intercept the communication message of the electric meter to determine whether it is a motherboard problem or a problem with the electric meter, and replace the faulty components.

5.2.7 Station offline

Trouble phenomenon:

The background shows that the charging device is offline or the charging device network is not connected.

Troubleshooting ideas:

- 1) Check whether the pile is tripped and powered off. If there is no power, push the switch and power on.
- 2) Check whether the communication module indicator of the pile is normal, first re-burn the communication module program, if it fails to go online, it can be confirmed by replacing the communication module, and if it is damaged, replace it.
- 3) Confirm whether the SIM card is in arrears, and you can renew it or change the SIM card directly.
- 4) Web setting confirms whether the OCPP configuration is correct.

5.2.8 Charger input overvoltage

Trouble phenomenon:

The screen displays " input overvoltage "

Working principle:

According to product technical indicators, the input working voltage of the charging equipment is three-

phase five-wire AC400V±10%.

Troubleshooting ideas.

- 1) Use a multimeter to measure the incoming line voltage. If it is higher than 440V, you need to contact the customer or the site to inform the reason why it needs to be adjusted (add voltage regulator, etc.).
- 2) Check the power supply module and the CAN communication line of the module. There may be a problem when uploading data. If there is an abnormality, rectify it. Use a multimeter to measure the incoming line voltage. If the overvoltage fault is still reported, check and replace the power module for testing.

5.2.9 Charger input under voltage

Trouble phenomenon:

The screen displays " input undervoltage "

working principle:

According to product technical indicators, the input working voltage of the charging equipment is three-phase five-wire AC400V±10%.

Troubleshooting ideas:

- 1) Check the switch status of the circuit breaker at the incoming line, if it has been tripped, push the switch and power on.
- 2) Use a multimeter to measure the incoming line voltage. If it is lower than 360V, you need to contact the customer or the site to inform the reason why it needs to be adjusted (add voltage regulator, etc.)
- 3) Check the power module and the CAN communication line of the module. There may be a problem when uploading data. If there is an abnormality, rectify it. If the incoming line voltage is measured with a multimeter within the normal range but still reports an undervoltage fault, consider troubleshooting and replacing the power module for testing.

5.2.10 Insulation failure

Trouble phenomenon:

The screen displays " insulation fault "

Working principle:

The main idea of insulation detection --- by opening or closing K1, K2 , three circuit states are obtained, and AD values are collected in these three states respectively . List the equations and settle the insulation resistance of DC+ and DC- to ground. Then according to the insulation testing standards required

by the European standard, it can be judged whether the insulation meets the standards.

Troubleshooting ideas:

- 1) Check whether there is damp or water in the tip of the charging gun, if necessary, dry it before using it, and then check the charging status.
- 2) Different versions of the insulation board program may cause this problem. In this case, the insulation program can be upgraded to the latest version for trial charging and troubleshooting.
- 3) Check whether the wiring of each port of the insulation detection board hardware is normal, use a multimeter to test, if there is a problem with the wiring, rectify the wiring, if the hardware is due to the problem, replace the insulation detection board for testing.
- 4) Control and turn off the output power relay coil charging apparatus main circuit, and then start charging device, use a multimeter to measure the voltage at the lower end of the DC+ and DC- relay. If the voltage is found, Use PLC message software and tools to intercept the alarm charging device messages, view and feedback, if it is a pile-end software problem, it will feed back the research and development changes, if it is a car-end problem, it needs to be connected to the car factory to make corresponding changes.

5.2.11 The cabinet door is opened

Trouble phenomenon:

The screen displays " cabinet door is opened "

Troubleshooting ideas:

- 1) Check if the cabinet door is open.
- 2) Check whether the line from the door limit switch to the main board is normal, whether there is any virtual connection error, whether the terminal port is abnormal, if not, change the line or replace the main board for test.

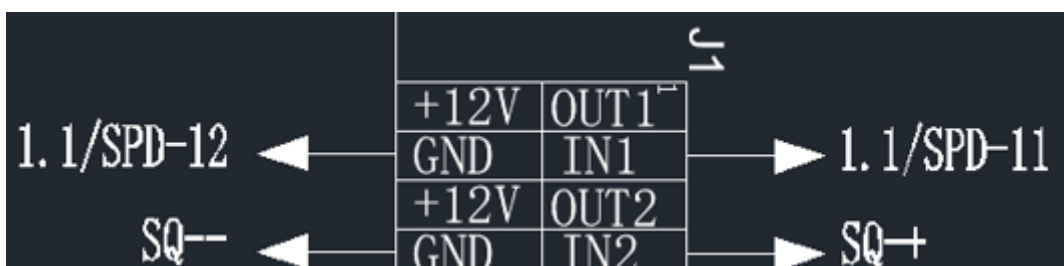


Figure 10 Schematic diagram of travel switch

- 3) Measure the cabinet door travel switch, whether the normally open and normally closed hardware functions are normal, if it is abnormal, replace the travel switch.

5.2.12 Relay failure

Trouble phenomenon:

The screen displays " relay failure "

Troubleshooting ideas:

The outside voltage of the K1 and K2 relays at the pile ends is greater than 10V . This voltage is from the car terminal. Intercept the message and check it, flash the compatible program or contact the car factory for coordination.

5.2.13 Station output capacity mismatch

Trouble phenomenon:

failed to activate

Troubleshooting ideas:

The vehicle sending demand voltage is higher than the maximum output voltage of the pile. Check whether the maximum output voltage of the module meets the demand of the vehicle. You can report this situation to the company personnel and replace the module.

5.2.14 No effective current output during charging

Trouble phenomenon:

After starting the charging device, the required voltage and current are displayed on the screen, but there is output voltage but no output current.

Troubleshooting ideas:

- 1) Check whether the DC contactor circuit is correct, whether the contactor coil control line has a signal after starting, if there is no signal, please change the line to the correct line。
- 2) Use a multimeter to measure whether the two ends of the DC contactor are connected after receiving the pull-in signal. If not, please replace the DC contactor.
- 3) A multimeter measures whether the fuse is on, if not, please replace the fuse.

5.2.15 Abnormal order power data

Trouble phenomenon:

The charging settlement has no battery or large battery, which does not match the actual.

Troubleshooting ideas:

- 1) Check whether the electric meter is abnormal, observe whether the electricity metering of the electric meter is normal, if it is abnormal, judge that the electric meter is faulty and replace it.
- 2) Check whether the communication line between the electric meter and the main board is abnormally loose, if so, tighten or replace it.
- 3) Use the 485 tool to intercept the communication message between the main board and the meter to see if the communication between the two parties is normal, and if one of the parties is abnormal, replace it.
- 4) Check whether there is an error in the process of sending power to the background, or whether the background has an error in receiving and processing power. After making relevant program changes, perform program update test verification.

5.2.16 No response when swiping the card

Trouble phenomenon:

Swiping the card to start charging, the charging device does not respond or prompts " card swiping failed", " The card does not have permission to charge at this pile ".

Working principle:

After the IC card is swiped on the card reader module, it is controlled by the program through the main board, and after the start command is issued, the charging device starts charging.

Troubleshooting ideas:

- 1) Troubleshoot whether there is a problem with the card swiping operation. Try to swipe the card again. Do not swipe the card too fast. The IC card stays in the swiping position for about 3s before removing it, or do not quickly repeat the swipe and then stay for 5s and then swipe the card again.
- 2) Check whether the wrong IC card is taken, and instruct the customer to re-swipe the card after replacing the IC card. It is recommended to mark the IC card.
- 3) Check whether the IC card issued to the customer is the type required by the customer. For example, if other types of cards, such as the start-stop card, are issued to the customer, the IC card cannot be used, and the correct type of IC card needs to be replaced.
- 4) Check the local signal problem, and check whether it is a signal problem that causes the real-time status upload of the pile end to be delayed. After the background delay, the swiping of the card fails. If

the on-site signal is poor, carry out enhancements to the on-site signal.

5.2.17 The maximum output capacity of the pile cannot be reached when charging

Trouble phenomenon:

Low output current of charging equipment

Troubleshooting ideas:

- 1) Check the module details and whether the module indicator is abnormal during the charging process. If the power module is found to be faulty, find the faulty module and replace it.
- 2) Web setting, whether the highest output voltage and current are set abnormally, if the setting is wrong, correct it.

5.2.18 The cooling fan does not work when charging

Trouble phenomenon:

When charging, the cooling fan of the charging device does not rotate, and abnormal heat dissipation and current drop occur during the charging process:

Troubleshooting ideas

- 1) Check whether the fan power line is loose, or short-circuited or open. If there is an abnormality, correct the line.
- 2) Check whether the power supply voltage of the fan power supply is normal. If it is normal, judge that the fan is faulty and replace the fan.
- 3) If the power supply voltage of the fan power supply is abnormal, check whether the mainboard port or related control relay is normally energized. If it is abnormal, replace the mainboard.

5.2.19 The power supply is normal, but the PCB board is not powered

Trouble phenomenon:

The indicator light of the PCB board (main board, insulation board, etc.) in the charging device is not bright.

Troubleshooting ideas:

- 1) Check whether the relevant power lines are loose, short-circuited, or open, and rectify them.
- 2) Check whether the output of the corresponding switching power supply is normal. If it is abnormal, judge whether the switching power supply has no output due to its own failure, or whether the output

is abnormal due to the short circuit of other components on the output line, and replace it accordingly.

5.2.20 The power supply is normal, but the touch screen is not powered

Trouble phenomenon:

The charging device screen does not light up

Working principle:

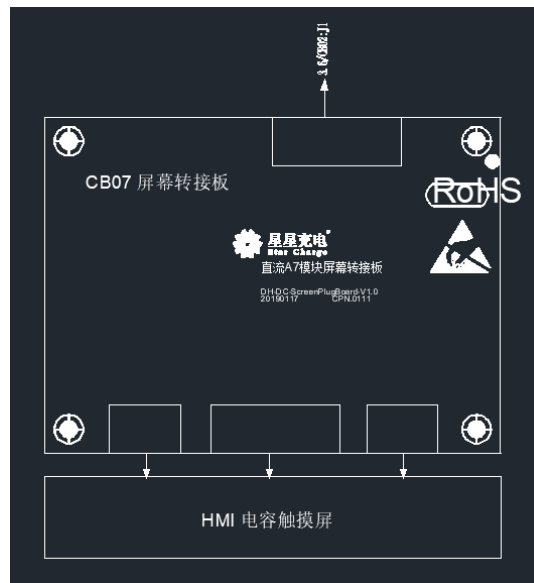


Figure 11 Schematic diagram of the touch screen adapter board

Troubleshooting ideas:

- 1) Check whether the voltage at the input terminal and output terminal of the circuit breaker is normal. If the input terminal voltage is 230V and there is no voltage at the output terminal, or the circuit breaker cannot be switched on, replace the circuit breaker.
- 2) Check whether the wiring is correct, whether it is loose, short-circuited or open, and if any abnormal wiring is found, rectify it
- 3) Check whether the switching power supply that supplies power to the screen is normal. If the circuit and power supply are normal, but there is no 24V output, replace the switching power supply.
- 4) Check whether there is power at the power input end of the screen. If there is, the screen is faulty. Replace the screen.

5.2.21 Reverse connection failure

Trouble phenomenon:

Starting charging is unsuccessful, the charging device prompts " reverse connection failure

Troubleshooting ideas:

The common reason is that the positive and negative connections of the DC+ and DC- terminals of the charging equipment are reversed. Remove the DC output wires DC+ and DC- and re-wire and tighten them in the correct way.

5.2.22 The touch screen cannot read and set parameters

Trouble phenomenon:

The touch screen cannot read or set the parameters, and there is no response after clicking

Troubleshooting ideas:

- 1) Check whether the communication line between the screen and the main board is loose, check the internal connection and disconnection of the line, if it is abnormal, correct the line and replace it.
- 2) Check whether the mainboard heartbeat indicator flashes normally. If it is abnormal and the indicator light is always on, the mainboard crashes. First update the latest stable version of the program. If the problem persists, replace the mainboard.
- 3) Use the 485 tool to intercept the communication message between the screen and the main board to determine which party is abnormal. If the main board does not respond, replace it.

5.2.23 Unable to boost

Trouble phenomenon:

The output current is greater than the set current, the screen displays " overcurrent fault "

Troubleshooting ideas:

- 1) Observe the flashing status of the module indicator and find out the faulty module
- 2) Communicate the development and modification of program software, and control the abnormal current output of the module.

5.2.24 Unable to boost

Trouble phenomenon:

The output voltage cannot be increased during charging

Troubleshooting ideas:

- 1) It may be that the module is faulty and the voltage cannot be boosted for insulation testing. Observe the flashing status of the module indicator, and replace the module if it is faulty.
- 2) In the parameter setting, the highest output voltage is not set correctly, which is lower than the vehicle

battery voltage.

5.2.25 There is voltage but no current

Trouble phenomenon:

After starting charging, the output has voltage and no current

Troubleshooting ideas:

- 1) The module may be faulty, replace the faulty module.
- 2) If the high-voltage switch relay at the vehicle end is not energized or the DC output relay of the charging equipment is not energized, measure the voltage across the upper and lower ends of the DC output relay of the charging equipment. If the measured voltage is the set voltage from the vehicle end, then the vehicle-side relay is not energized. If the voltage value output by the station-side module and the actual voltage value of the vehicle-side battery can be measured, the station-side relay is not energized. By measuring whether the relay has a power supply of 12V, to further judged whether it is the main board or the relay fault. If the relay terminal receives 12V, the relay is faulty, if not, the main board is faulty, replace the corresponding faulty hardware.
- 3) If the inspection hardware is normal, then intercept the communication message between the charging equipment and the car and send it to research and development analysis, optimize and compatible programs.