

DC Compact Service Manual

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1. Security Compliance

Disconnect the power supply to the MaxiCharger during the entire maintenance procedure.

- The load capacity of the grid must meet the requirements of the MaxiCharger.
- Connect the MaxiCharger to a grounded, metal, permanent wiring system. Otherwise, use the equipment-grounding conductor with the circuit conductors and connect it to the equipment grounding terminal or lead on the product.
- Unqualified personnel must keep a safe distance during the entire maintenance procedure.
- The connections to the MaxiCharger must comply with all applicable local rules.
- Only use electrical wires of sufficient gauge and insulation to handle the rated current and voltage demand.
- Protect the wiring inside the MaxiCharger from damage and do not obstruct the wiring when you perform maintenance on the cabinet.
- Keep the cabinet away from all water source.
- Protect the MaxiCharger with safety devices and measures as specified by local rules.
- Wear proper personal protective equipment such as protective clothing, safety gloves, safety shoes, and safety glasses when necessary.

Refer to “MaxiCharger DC installation and Operation Manual” for more details.

2. Terms and Abbreviations

No.	Abbreviations	Detailed Description
1	AC	Alternative Current
2	ALM	Adaptive Load Management
3	BMS	Battery Management System
4	CAN	Controller Area Network
5	CCS	Combined Charging System
6	CCU	Communication Control Unit
7	CHAdemo	trade name of a fast-charging system for battery electric vehicles
8	CPU	Central Processing Unit
9	DC	Direct Current
10	DLB	Dynamic Load Balancing
11	DNS	Domain Name System
12	DPA	Dynamic Power Allocation
13	DTC	Diagnostic Trouble Code
14	ECU	Electronic Control Unit
15	ELCB	Earth Leakage Circuit Breaker

16	FPGA	Field Programmable Gate Array
17	FW	Firmware
18	GFCI	Ground Fault Circuit Interrupter
19	IMU	Isolation Measurement Unit
20	MAC	Media Access control
21	MCB	Miniature Circuit Breaker
22	MCCB	Molded Case Circuit Breaker
23	MCU	Main Control Unit
24	NFC	Near Field Communication
25	OBD	On-Board Diagnostics
26	OCPI	Open Charge Point Interface
27	OCPP	Open Charge Point Protocol
28	OS	Operating System
29	PCB(A)	Printed Circuit Board (Assembly)
30	PLC	Programmable Logic Controller
31	PME	Protective Multiple Earthing
32	POS	Point of Sale
33	PWM	Pulse-width Modulation
34	RCBO	Electromagnetic type residual current operated circuit -breaker with integral overcurrent protection
35	RCCB	Residual Current Circuit Breaker
36	RCD	Residual Current Device
37	RFID	Radio-Frequency Identification
38	SIM	Subscriber Identity Module
39	SOC	State Of Charge
40	SOH	State Of Health
41	SPD	Surge Protective Device
42	SPI	Serial Peripheral Interface
43	TCU	Transmission Control Unit
44	USB	Universal Serial Bus
45	VCI	Vehicle Communication Interface
46	VtoG	Vehicle to Grid

3. Technical Specification

3.1 Screw Torque Table

Control board (M3 screws, torque value $5.5 \pm 10\%$ kgf.cm) , copper busbar (M4 screws, torque value $12 \pm 10\%$ kgf.cm ;M6 screws, torque value $12 \pm 10\%$ kgf.cm; M8 screws, torque value $70 \pm 10\%$ kgf.cm; M10 screws, torque value $120 \pm 10\%$ kgf.cm), circuit breaker (The specific value is subject to the recommended torque value that comes with

the part. If there is no recommended value, please refer to the following Table 1 for General Connection 2.), charger wire, DC contactor (M8 screws. The specific value is subject to the recommended torque value that comes with the part. If there is no recommended value, please refer to the following Table 1 for General Connection 2.), fan (M4 screws, torque value $12 \pm 10\%$ kgf.cm) and screen (M4 screws, torque value $12 \pm 10\%$ kgf.cm)

Table 1 Torque Wrench Calibration Table (Unit: kgf.cm)








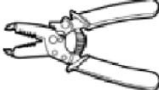





Screw Spec.	General Connection		
	1	2	3
	Steel (direct tapping, counter tapping) and die-cast aluminum	Steel (rivet nut or bolted joint)	Aluminum, copper and plastic
M2	1.5	1.5	0.8
M2.5	3	3	1.6
M3	5	5.5	3
M4	10	12	6
M5	13	20	10
M6	28	30	15
M8	65	70	35
<p>The values in this table are recommended values when the strength rating of the screw (nut) is 4.8 (≥ 6), the yield strength is greater than 200 MPa for the direct tapping base steel plate and greater than 175 MPa for other aluminum materials, and the selected die-cast aluminum is ADC12.</p> <p>When the materials of the two connecting materials are different, the corresponding value of the one with the lower material strength should be selected.</p> <p>Torque tolerance is $\pm 10\%$.</p>			

Adjust the torque to an appropriate level according to the diameter of the screws and nuts when screwing fasteners with an electric screwdriver to avoid damage to the cross groove of the screws. The adjustment basis is shown in Table 2.

Table 2 Correspondence between Electric Screwdriver Screwing Force and Fastener

Screw	Torque Range (kgf.cm)	Body Weight (Kg)	Body Length (mm)	Flexible Shaft Diameter (mm)
M2	2-5	0.27	196	6.35
M3	5-10	0.42	231	
M4	8-16	0.57	245	
M5	16-28	0.70	257	
M6	35-55	1.05	253	

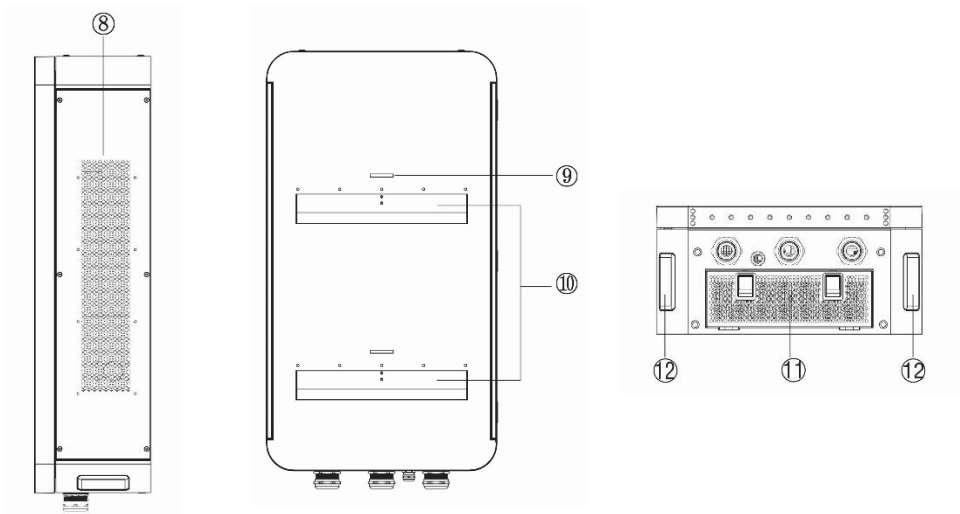
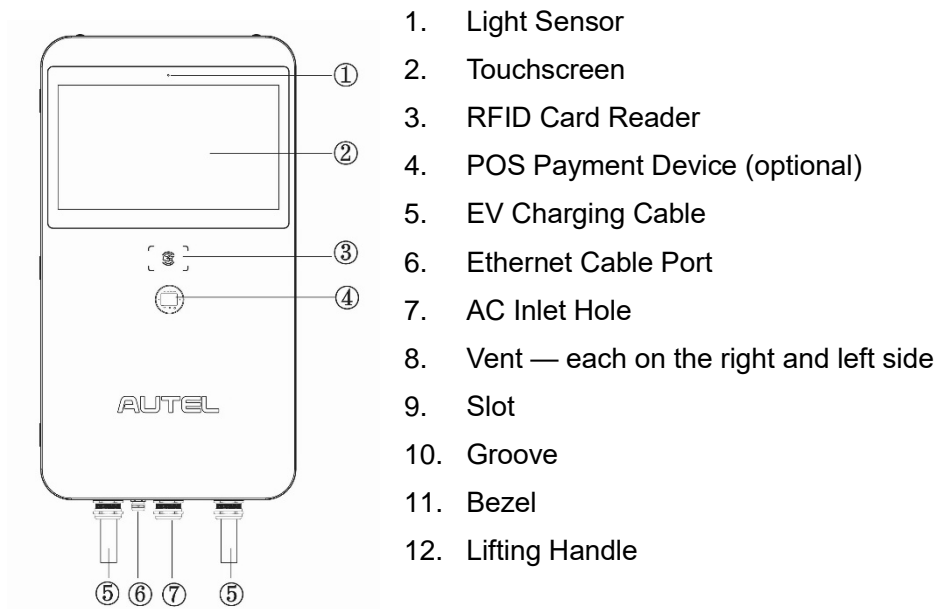
3.2 List of Maintenance Tools

Multi-meter		Screwdriver (type T25)	
Screwdriver (type T10)		Shifting Wrench	
Screwdriver (PH2)		Safety Shoes	
Safety Gloves		Wire Stripper	
Wire Cutter		Crimping Tool	
Heat Gun		Heat Shrink Tubing	
Suction Cup			

Electric screwdriver or Phillips screwdriver, torque wrench/socket wrench (5.5 mm (M3 hexagon screw), 7 mm (M4 hexagon screw), 10 mm (M6 hexagon screw), 13 mm (M8 hexagon screw), 16 mm (M10 hexagon screw)), suction cup (quantity: 2; used for replacement of TCU assembly)

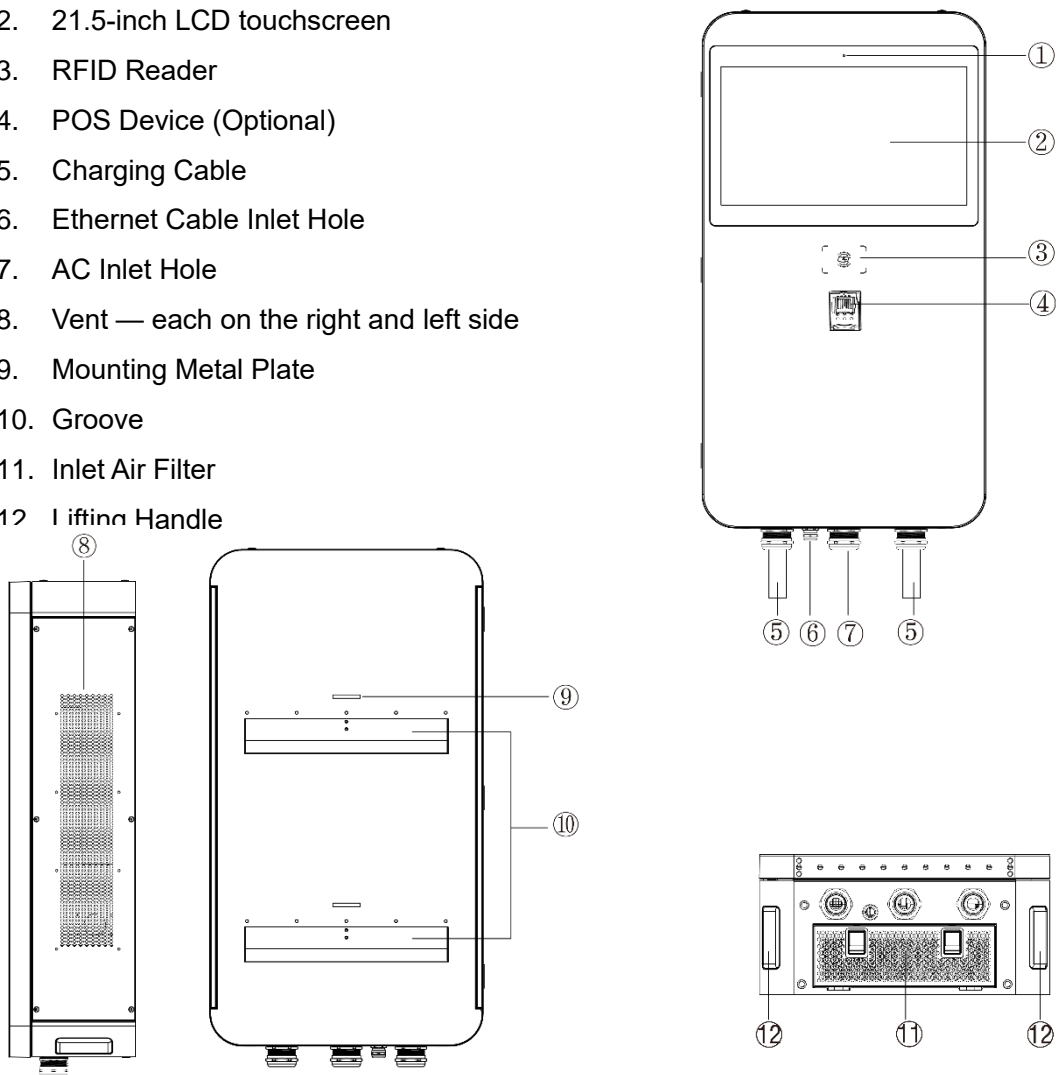
4. System Introduction

4.1 Product Overall (Outside)



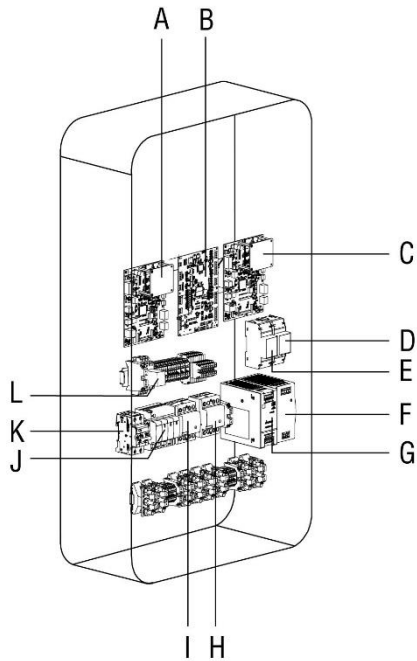
EU DC Compact Overall Layout (Outside)

1. Ambient Light Sensor — detects ambient brightness
2. 21.5-inch LCD touchscreen
3. RFID Reader
4. POS Device (Optional)
5. Charging Cable
6. Ethernet Cable Inlet Hole
7. AC Inlet Hole
8. Vent — each on the right and left side
9. Mounting Metal Plate
10. Groove
11. Inlet Air Filter
12. Lifting Handle



US DC Compact Overall Layout (Outside)

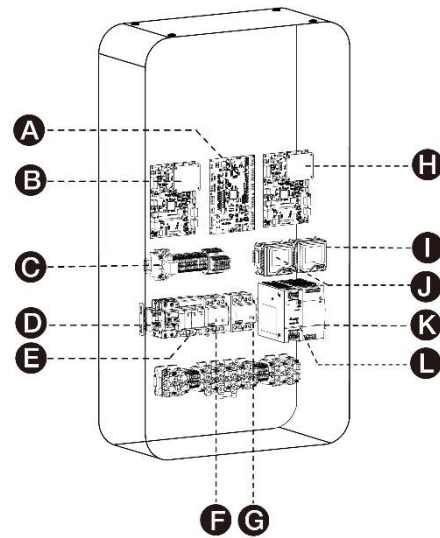
4.2 Product Overall (Inside)



A	Inertial Measurement Unit 1
B	Electronic Control Unit
C	Inertial Measurement Unit 2
D	Energy Meter (PJ1)
E	Energy Meter (PJ2)
F	48 V Auxiliary Power
G	24 V Auxiliary Power
H	AC Contactor (KM2)
I	AC Contactor (KM1)
J	Surge Protection Device
K	Fuse
L	Intermediate Relay

EU DC Compact Overall Layout (Inside)

-
- | | |
|----------|------------------------------|
| A | Electronic Control Unit |
| B | Inertial Measurement Unit 1 |
| C | Intermediate Relay |
| D | Fuse |
| E | SPD, Surge Protective Device |
| F | AC Contactor 1 |
| G | AC Contactor 2 |
| H | Inertial Measurement Unit 2 |
| I | Energy Meter 2 |
| J | Energy Meter 1 |
| K | 48 V Auxiliary Power |
| L | 24 V Auxiliary Power |



US DC Compact Overall Layout (Inside)

5. Maintenance Requirements

5.1 General Maintenance Requirements

Periodic maintenance must be established in order to obtain the best service from the EVSE charger. An annual check of the switchgear devices and all connections should be the minimum requirement. Equipment subject to highly repetitive operation may require more frequent maintenance. A permanent record of all maintenance work should be kept. The record should include a list of periodic checks and tests made, the date they were made, the condition of the equipment, and any repairs or adjustments that were performed. Maintenance employees must follow all recognized safety practices, such as those contained in the National Electric Safety Code and in company or other safety regulations. For specific information regarding the maintenance of devices, such as AC contactor, RCCB, relays, meters, etc, refer to the separate instruction book provided for each device.

5.2 Enclosure Maintenance Requirements

The enclosure station requires no maintenance other than occasional cleaning. Warning: To reduce the risk of electrical shock or equipment damage, do not allow opening the unit while cleaning it. Enclosure maintenance is performed only externally. Clean the enclosure using a soft cloth lightly moistened with mild detergent solution. Never use any type of abrasive pad, scouring powder, or flammable solvents such as alcohol or benzene.

5.3 Power Circuit Maintenance Requirements

Inspection of the power circuit is recommended at least once a month. More frequent inspections are recommended if several load conditions, dust, moisture, or other unfavorable conditions exist.

- RCCB

If the breaker remains open or closed for a long period of time, it is recommended that arrangements be made to open and close it several times in succession, preferably under load.

At all times, it is important not to permit paint, oil or other foreign materials to remain on the insulating surfaces or the breaker as they may cause low resistance between points of different potential and result in eventual electrical breakdown.

Always inspect the devices after a short circuit current has been interrupted.

Normally, the over current protective device on the circuit will prevent any electrical damage except at the actual point of the short circuit.

A thorough inspection of the entire system must be made after any large fault current to insure that there has been no mechanical damage to conductors, insulation, or equipment.

Do not open sealed devices such as breaker trip units. If there is any possibility that sealed units may have been damaged, they should be replaced.

At the time of inspection, the following checks should be made after the device has been de-energized.

- Manually operate the device several times checking for obstructions or excessive friction.
- Electrically operate the device several times (if breaker has electrical control) to ascertain whether the electrical attachments are functioning properly.
- Break-age of parts or extensive burning will indicate need for replacement.
- Check operation of tripping devices, including over current trip devices, making sure all have positive tripping action. (Discernible movement in tripping direction beyond point of tripping).
- Push test-button in the RCCB device: positive tripping action (ensure RCCB device is powered, therefor the RCCB should be closed manually).

- AC Contactor

Ensure a trouble free operation of the contactor until the next service is required. As in the previous devices, always inspect the device after main breaker tripping. At the same time, observations can be made to judge if the contactor operates well in the application.

Ensure that electrical continuity in all the poles is retained and should be operable in ON/trip/reset sequence manually. If there is any possibility the unit has been damaged, it should be replaced. For additional details on the particular device, refer to the applicable instruction manual provided with the device.

- Impulse Surge Arrester

The surge arresters do not contain wearing parts and therefore, they are maintenance free.

Replacement parts are not needed. Maintenance is based into a visual inspection of the following parts:

- Check that the arrester housing is clean and free from where is installed.
- The monitoring device for leakage current (Fault indicator) is reviewed as it is indicated.

It is recommended to replace the units that caused the mechanical defect of the surge arrester.

5.4 Gaskets Maintenance Requirements

Gaskets require regular maintenance to prevent mold and mildew and to maintain the elasticity of the seal. Visually check the different gaskets or lid for tears or punctures. Leaks are indicated by a streak of frost that forms at the point of gasket failure.

Gasket and retainer groove cleaning can be accomplished with the use of warm soapy water and a soft bristle brush.

CAUTION: Avoid full strength cleaning products on gaskets as this can cause them to become brittle and prevent proper sealing. Never use sharp tools or knives to scrape or clean the gasket. This could tear the gaskets.

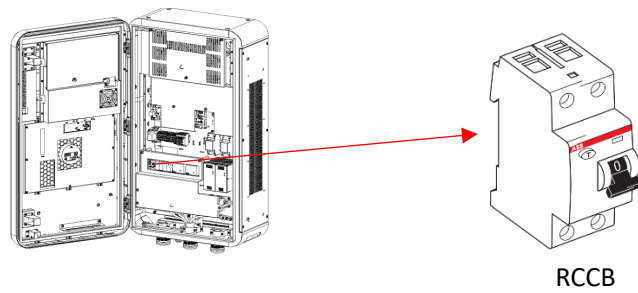
5.5 Cable Maintenance Requirements

Inspect and check the cables as follows:

- Inspect all power cable connections for signs of overheating and tighten all connections.
- If severe discoloration or if damage is apparent, remove the damaged cable and replace any device with damaged terminal.
- Check the neutral bus and earth bus connection and mounting bolts for tightness.
- Check that all wiring connections are tight and all control cabling is intact.

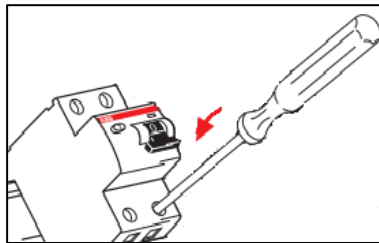
CAUTION: Be sure the condition which caused the overheating has been corrected before reenergizing.

5.6 Residual Current Circuit Breaker

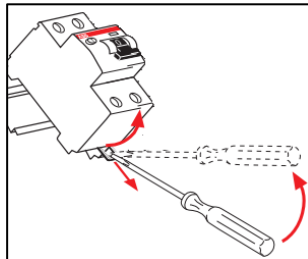


Steps to remove RCCB:

1. Disconnect the front circuit breaker of the charging pile and cut off the power supply of the charging pile;
2. Open the front door of the charging pile, and remove the RCCB front cover as shown in the figure;
3. Use a screwdriver to curve the connection cable of RCCB;

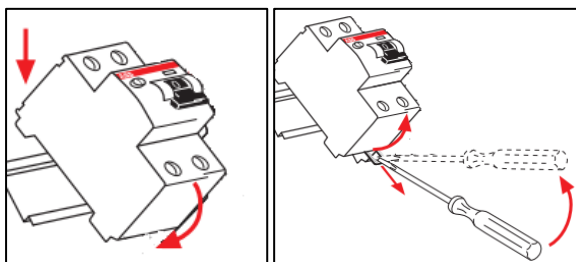


4. Use a screwdriver to pull out the buckle at the bottom of the RCCB and remove the RCCB.

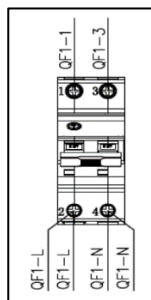
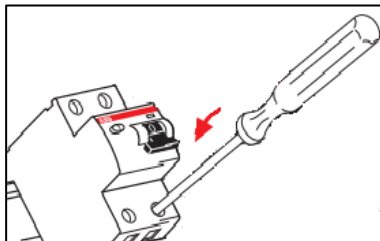


Steps to install RCCB:

1. Install the RCCB on the guide rail according to the diagram;

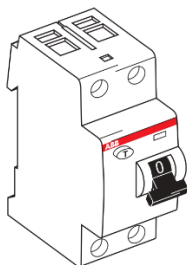


2. Connect the wire harness to the corresponding port of the RCCB according to the wire harness identification;



3. Restore the front cover of the RCCB and close all the doors of the charging pile;
4. Turn on the front-stage circuit breaker of the charging pile, connect the power supply, and wait for the charging pile to start before it can be used.

RCCB (model: F202A 25/0.03) parameters are as follows:



	F200 AC	F200A	F200 A AP-R	F200 A S
Standard	IEC61008	IEC/EN 61008,,UL 1053①		
Electrical characteristics				
Type (residual current operating characteristics)	AC	A	A	A
Number of poles	2P,4P			
Rated current I _n	A	16,25,40,63,80,100	25,40,63,80,100	40,63,80,100
Rated residual operating current I Δ _n	A	0.01-0.03-0.1-0.3	0.03	0.1-0.3-0.5-1
Rated working voltageU _e	IEC V	230/400 -240/415		
	UL/CSA V	480/277(Less than 63A)		
Rated insulation voltage U _i	V	500		
Maximum working voltage for circuit test	IEC V	254		
	UL/CSA V	277(Less than 63A)		
Minimum working voltage for circuit test	V	110(30mA 170V)		
Rated frequency	Hz	50/60		
Rated limited short-circuit current(I _{nc} =I Δ _c)	kA	10		
Rated impulse withstand voltage(1.2/50)U _{imp}	kV	6		
Dielectric test voltage, power frequency, 1 minute	kV	2.5		
Overvoltage category	III,Ability to divide			
No-trip inrush current (waveform 8/20)	A	250	3000	5000
Mechanical characteristics				
Toggle handle	Blue, with ON-OFF position indicator (lockable)			
Contact Position Indicator (CPI)	Yes			
Electrical life	10000			
Mechanical life	20000			
Degree of protection	Installed in the distribution box	IP4X		
	Direct installation	IP2X		
Moisture resistance	Hot and humid	°C/RH	55/95...100 is 28 cycles	
(Conforms to IEC/EN 60068-2)	Normal weather conditions	°C/RH	23/83-40/93-55/20	
	Special climate conditions	°C/RH	25/95-40/95	
Ambient temperature (daily average temperature) ≤+35°C)	IEC	°C	-25...+55	
	UL/CSA	°C	-35...+70 (Less than 63A)	
Storage temperature		°C	-40...+70	
Install				
Terminal model	Protected two-way post-type lifting terminal (shock-proof)(U-type terminal for I _n >63A)②			
Connectable cable terminal specifications (top/bottom)	IEC	mm²	25/25,35/35(Only suitable for U-type terminals with I _n >63A)	
	UL/CSA	AWG	18-4(Less than 63A)	
Specifications of row terminals that can be connected to the bus (top/bottom)	IEC	mm²	10/10 (not applicable to I _n =80-100A series)	
	UL/CSA	AWG	18-4(Less than 63A)	
Tightening torque	IEC	mm²	2.8; 4.8 (only for I _n >63A series)	
	UL/CSA	AWG	25 (Less than 63A)	
Tool	Pozi slot (double cross)			
Install	Mounted on DIN rail EN 60715 (35mm)			
Incoming line	Both top and bottom can be used as wire entry terminals			
Dimensions (HxDxW)	2P	mm	85x69x35	
	4P	mm	85x69x70	
① Relevant standards for ground fault measurement equipment and relay equipment (below 63A)				
②Before connecting aluminum wires (≥4mm), make sure the contacts are clean, brushed and lubricated.				

6. Disassembly and Reassembly Steps

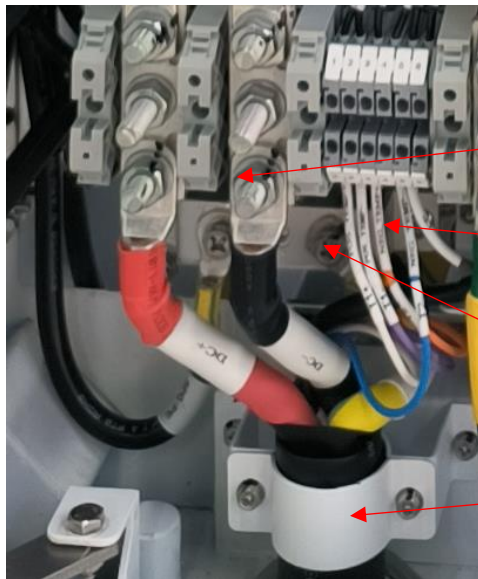
Important:

To ensure that the charger is powered off, the upstream circuit breaker/isolating switch of the charger must be cut off for component replacement. At the same time, the auxiliary power supply circuit breaker of the charger must be cut off.

Discharge static electricity before removing the cables and dismantling the components.

6.1 Charging Cable

- ① Loosen screws of the AC connector, PE bar, terminal and bracket.

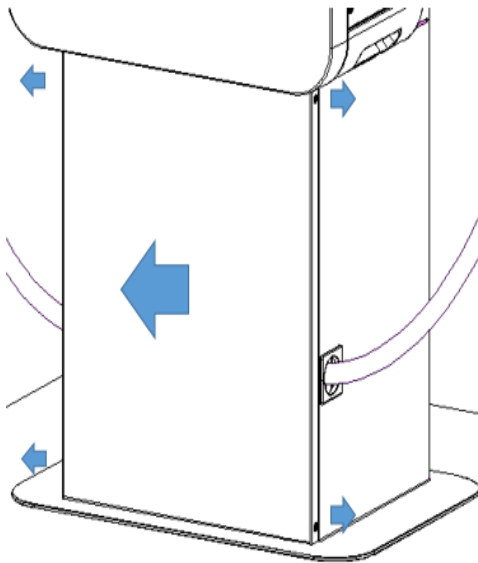


AC Connector

Control Cable

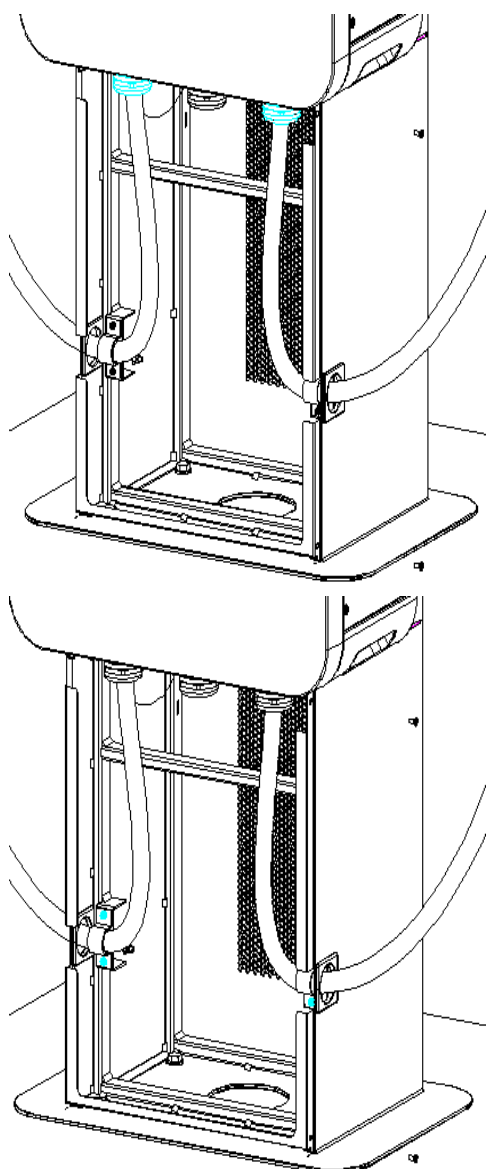
PE Busbar

Bracket



- ② Loosen the lower two security screws of the pedestal and remove the lower front cover.

- ③ Loosen the cable gland.

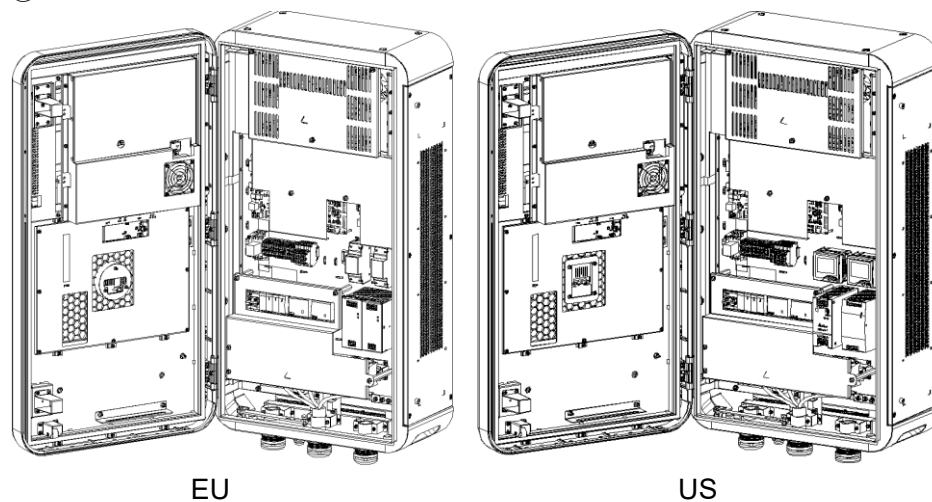


④ Unscrew the bracket on the side of the pedestal and pull out the cable.

⑤ Follow the reverse steps to install a new charging cable.

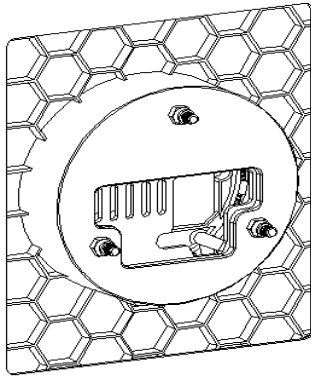
6.2 POS Device

① Remove the cable from the POS device.

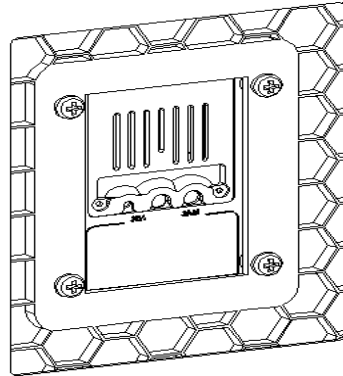


② For EU version, unscrew the M4 (3 pcs) nuts securing the POS device using the 7mm socket.

For US version, unscrew the M5 (3 pcs) screws securing the POS device using the screwdriver..

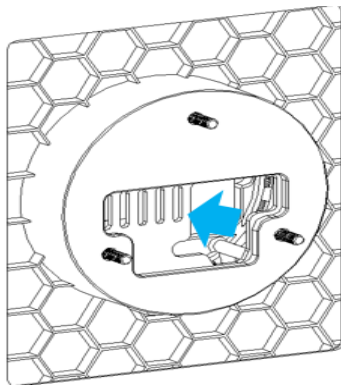


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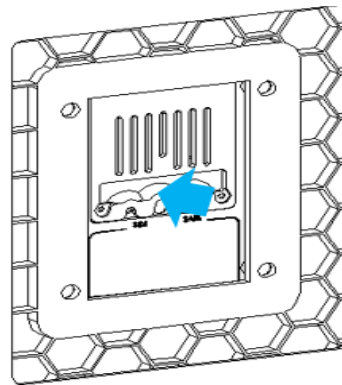


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③ Remove the POS device from the front side of charger.



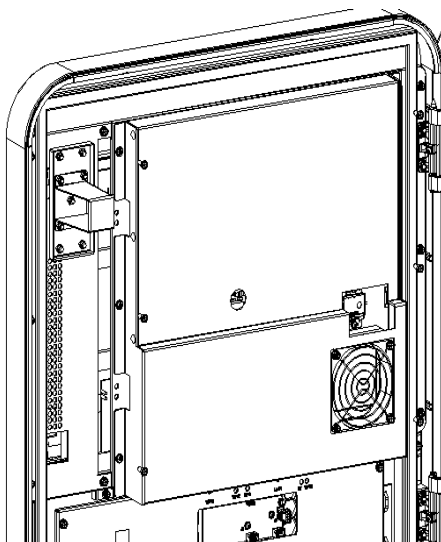
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⑤ Follow the reverse steps to install a new POS device.

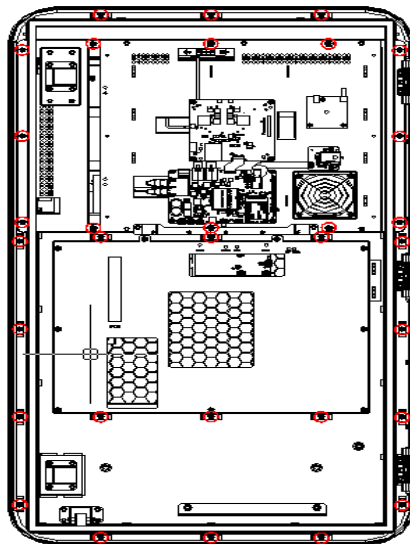
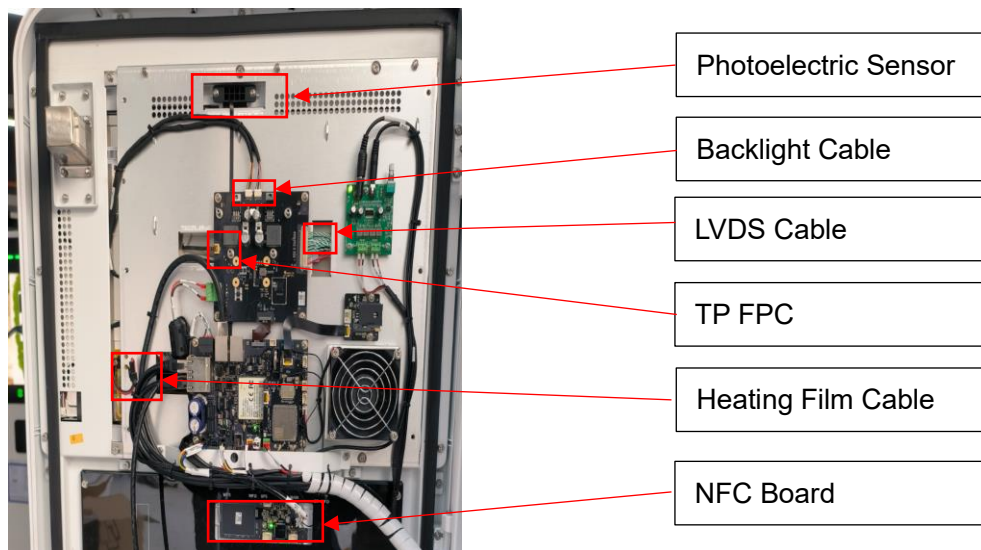
6.3 Screen



①. Unscrew the M4 screws (6 pcs) of the PC cover on the back of screen using screwdriver

②. Remove POS device (Optional) following the steps above.

③ Remove Photoelectric Sensor, Backlight cable, LVDS cable, TP FPC, heating film cable and NFC board.

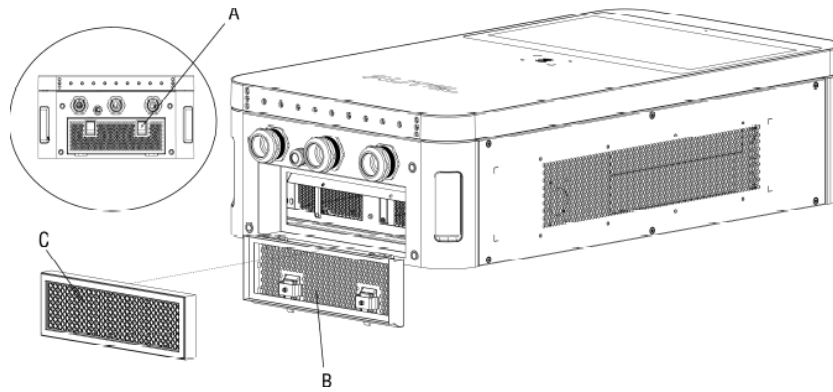


④. Unscrew the faceplate securing screws using screwdriver and remove the faceplate (Including the screen).

⑤. Follow the reverse steps to install a new faceplate (Including the screen).

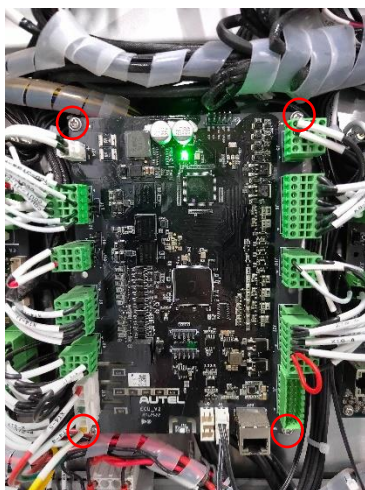
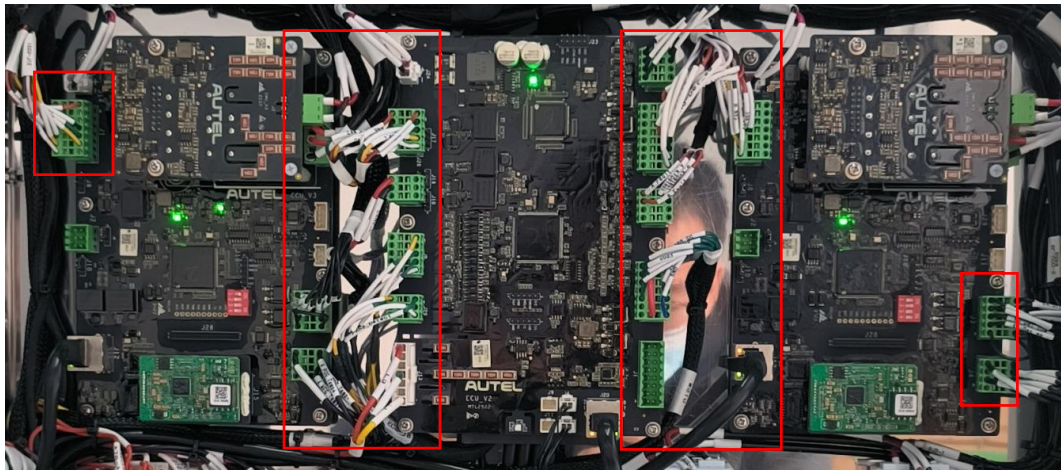
6.4 Filter

- ①. Open the two toggle latches (A) at the bottom of the MaxiCharger to flip the bezel (B) downward.
- ②. Remove the filter (C).
- ③. Clean debris or dust of the filter and reinstall a cleaned filter.
- ④. Install a new air filter.
- ⑤. Flip the bezel (B) upwards and close the two toggle latches (A).



6.5 PCBA

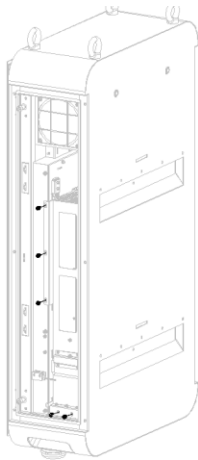
- ① Remove the wires on the PCBA



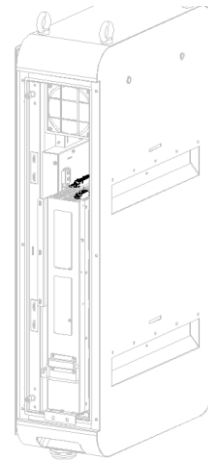
- ② Unscrew the securing screws and remove the PCBA.

- ③ Replace a new PCBA following the reverse steps.

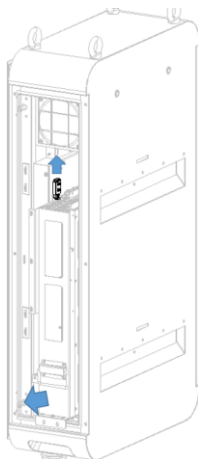
6.6 Charging modules



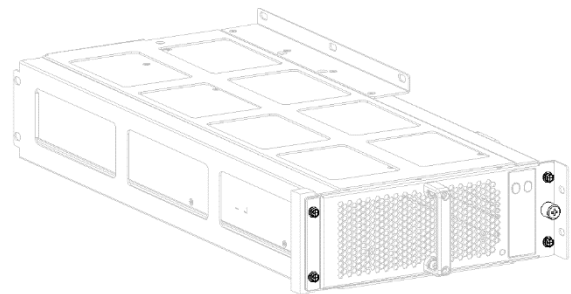
①. Remove the securing screws (M4) outside.



②. Pull the module assembly to the limit and remove the cable.



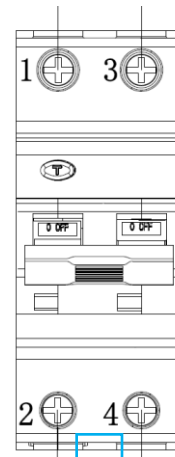
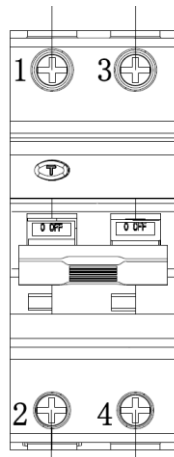
③. Pull the module assembly up and pull it out.



④. Remove the securing screws at bottom, then take out the module.

6.7 RCCB and AC contactor

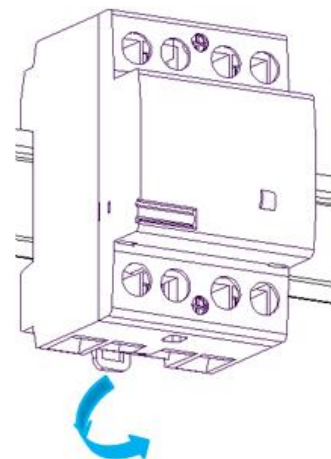
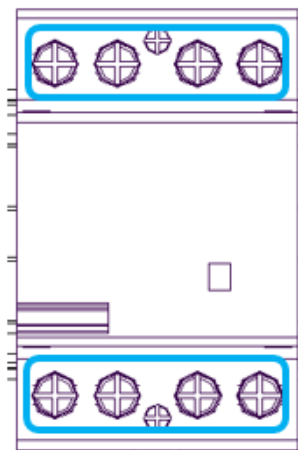
RCCB



①.Remove the cables from the terminals.

②.Pull the buckle down to remove the device from the rail.

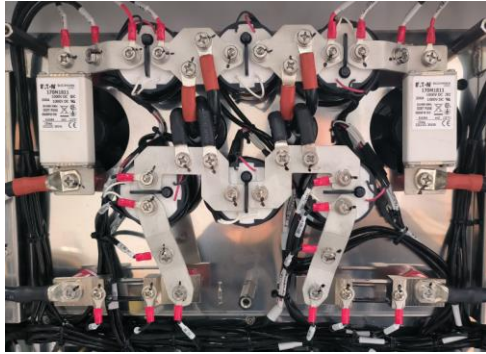
AC Contactor



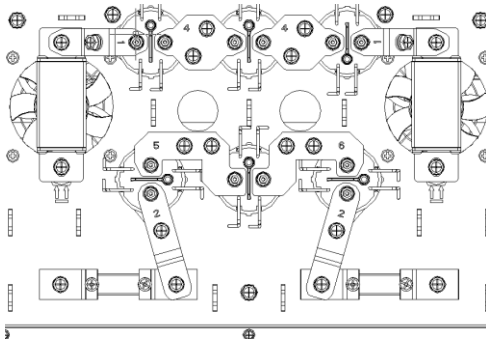
①.Remove the cables from the terminals.

②.Pull the buckle down to remove the device from the rail.

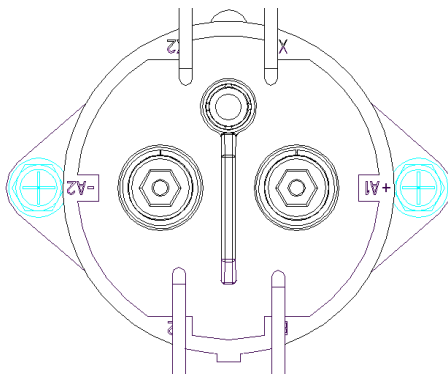
6.8 DC Contactor



①.Remove the cables from the DC contactor.

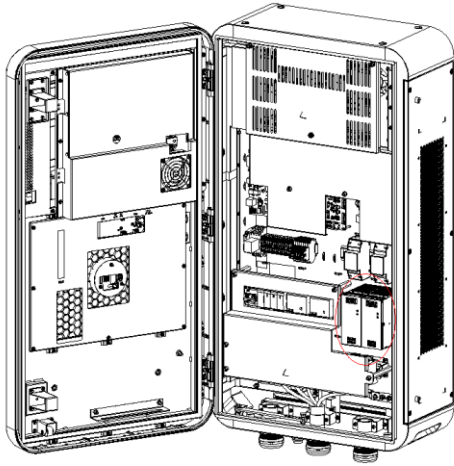


②.Remove the copper bar above the DC contactor.

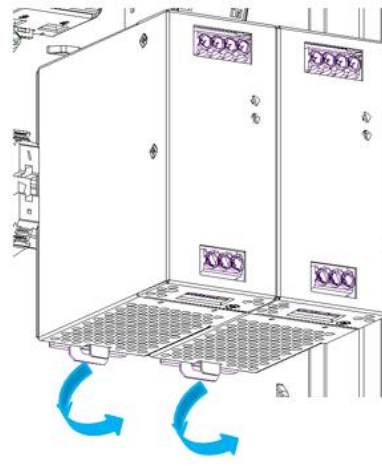


③ .Unscrew the two securing screws at bottom of the DC contactor.



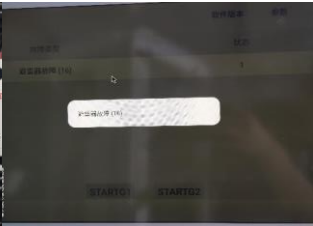
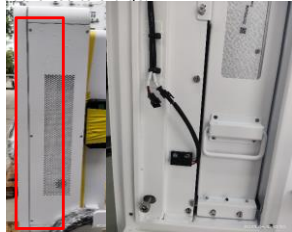
6.9 Auxiliary Power Supply



① .Remove the cables from the auxiliary power supply.



② .Pull the buckle down to remove the device from the rail.

No.	Chapter	Test items		Requirement
1	Enterprise standard requirements	Safety Requirements Test	Circuit breaker function test	After the "TEST" button is triggered, the circuit breaker trips and the system is powered off
Test method: 1. In standby mode, open the main maintenance door, trigger the indicator button "TEST" on the label FB2, the circuit breaker trips, and the system is powered off.				
				
No.	Chapter	Test items		Requirement
2	Enterprise standard requirements	Safety Requirements Test	Circuit breaker function test	The charging pile cannot start charging, the LCD reports the corresponding fault information, and the charging pile is not allowed to charge
Test method: 1. In standby mode, open the main door for maintenance, pull out the arrester resistor, the pile display interface will report "lightning arrester failure", and the charging pile is not allowed to charge.				
 				
No.	Chapter	Test items		Requirement
3	Enterprise standard requirements	Safety Requirements Test	Access control failure	After the access control fault is triggered, the LCD reports a response fault message, and the charging pile is not allowed to charge
Test method: 1. In standby mode, open the left and right doors for maintenance respectively, the pile display interface will report "access control failure", and the charging pile is not allowed to charge.				
				

7. Revision History

Version	Date	Descriptions
V1	2022.10.20	Initial version
V1.1	2023.04.13	Model updated 5.6 Residual Current Circuit Breaker updated.