Neuron III Lite

Product Manual

Version December 2025

Always-control Technology Co., Ltd.

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When installing and using this product, it is imperative to comply with all relevant state, regional, and local safety regulations. For safety reasons and to ensure compliance with recorded system data requirements, only the manufacturer is authorized to perform maintenance on the components.

When the equipment is used in application scenarios with technical safety requirements, the corresponding operating instructions must be followed.

The use of software not provided by Always-control Technology Co., Ltd. or unapproved software in conjunction with our hardware products may result in personal injury, equipment damage, or abnormal operation results.

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1、Introduction

1.1. Product Overview

Neuron III Lite is an intelligent charging management system specially designed for modern families, aiming to provide refined and efficient charging pile scheduling and safety management solutions. It focuses on the refined management and optimized scheduling of charging piles. The system supports connecting up to two charging piles at most, perfectly adapting to the needs of dual-car families or shared parking spaces, and can achieve unified management without additional complex configuration. It adopts the average distribution mode for dynamic load balancing by default. The system automatically calculates and optimizes current distribution. When two charging piles work simultaneously, the remaining current that is safely available at present is evenly distributed, ensuring that both vehicles obtain the most balanced and efficient charging experience. The system settings support local deployment with simple configuration and fast response speed. It does not overly rely on cloud connections and pays more attention to the privacy protection of user data.

1.2. Package Contents

No.	Product Name	Quantity
1	Neuron III Lite Terminal Controller	1
2	Quick Start Guide	1
3	Warranty Card	1
4	3Pin AC Power Input Terminal	1
5	Split Core CT Loop (Standard 100A, Cable Length 100cm)	1

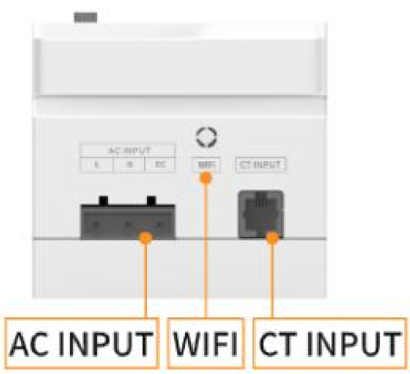
2、Equipment Introduction

2.1. Neuron III Lite Terminal Controller

2.1.1. Terminal Controller Introduction

The terminal controller is equipped with a Bluetooth (BLE) module and an integrated WIFI interface to support the external network connection of the device. Settings are operated and status is monitored by connecting the controller via Bluetooth. The controller is equipped with 1 setting button, 1 reset button, 6 LED indicators and 1 RGB indicator to display the working status of the product. The maximum incoming current can be set by adjusting the setting button.

Neuron III-Lite (N3 Lite) Front-view



Neuron III-Lite (N3 Lite) Top-view

Neuron III-Lite (N3 Lite) Bottom-view

Mark in Diagram	Name	Description
SYS	Module Status Indicator	Steady Green: Device bound successfully and running normally
		Yellow: No device bound (refer to 4.3.1 for binding instructions)
		Steady Red: Alarm prompt. Please restart the device at this time. If it is still steady red after restarting, please contact technical support personnel.
SET	Setting Button	Long press the setting button for 3 seconds. After the current threshold indicator flashes once, you can set it. Short press to switch the maximum incoming current threshold. Long press again for 3 seconds, and confirm the setting after it flashes once.
RESET	Reset Button	Use a SIM card pin or other slender hard object with a diameter less than 1mm to insert into the reset hole, press gently, and release when you feel the elastic feedback of the button. The device will restart immediately.
LED	Maximum Incoming Current Threshold Indicator	Indicates the current maximum incoming current threshold.
CT INPUT	Current Sensor Input Terminal	RJ9 input terminal, transformation ratio 3000:1, split core CT loop (standard 100A, cable length 100cm). (Note: The direction of the CT loop should not be connected incorrectly. Reverse connection may affect the normal operation of the device. Refer to 3.3.2 for wiring instructions.)

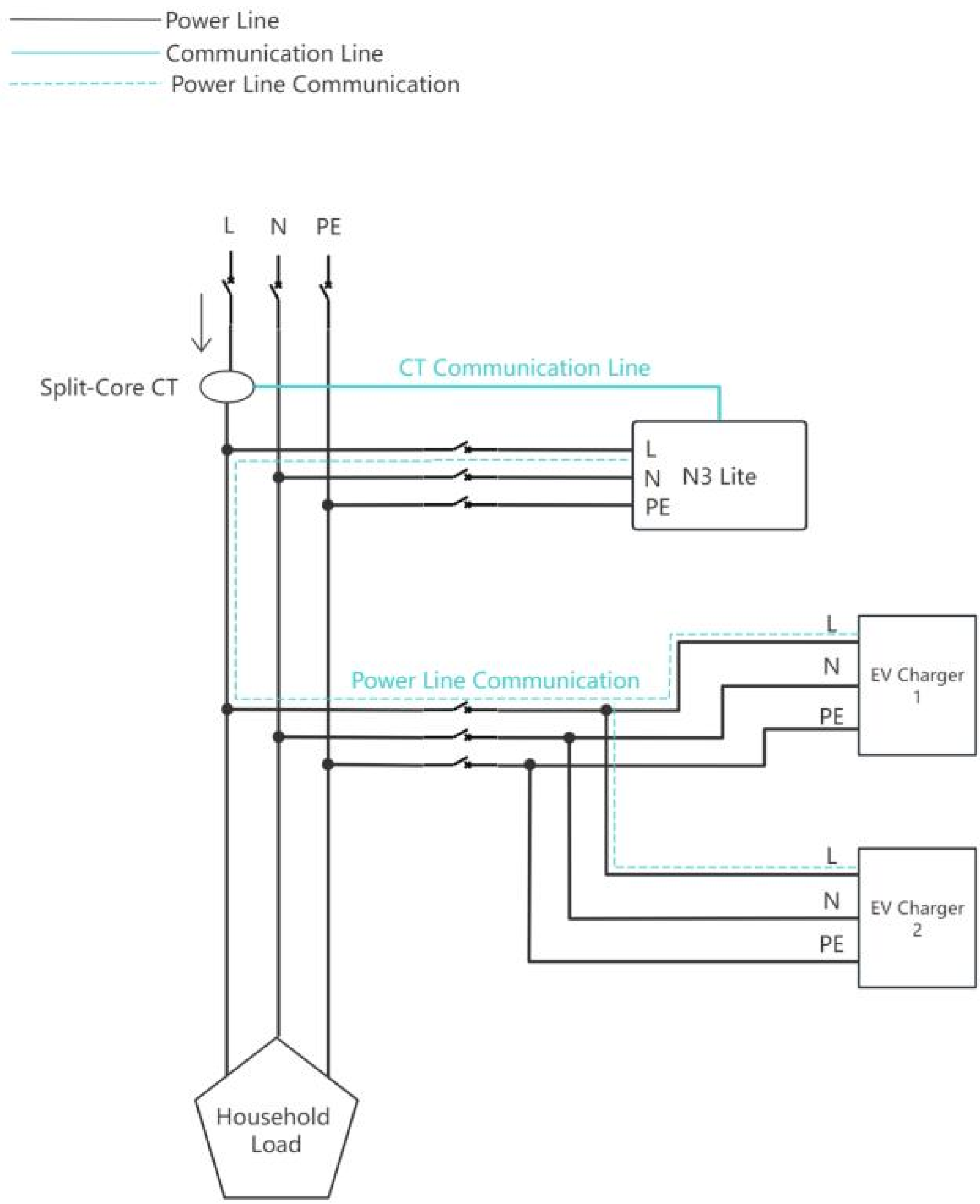
WIFI	WIFI Antenna Reserved Interface	N3 Lite has a built-in antenna, and this interface is only for external antennas.
AC INPUT	Power Input Terminal	L connects to live wire, N connects to neutral wire, PE connects to ground wire(Copper core cable 14AWG~20AWG, recommended wire diameter: 14AWG, 2.1mm², refer to 3.3.1 for wiring instructions).

2.1.2. Specification Description

Configuration	**Details**
MCU	Xtensa Dual-Core 32-bit LX6 Microprocessor
Bluetooth&WIFI	2.4GHz WIFI, Bluetooth V4.2 BR/EDR and Bluetooth LE Standard
PLC	Supports P1901.1, supports OFDM/FSK modulation
Power Monitoring	Supports voltage, current, and power monitoring
Buttons	1 Current Gear Setting Button, 1 RESET Button
LED	6 Monochromatic LEDs (Green), 1 RGB LED
Interfaces	
Power Interface	3Pin Single-Phase AC Input Interface
Split-Core CT Interface	1 Channel Split-Core CT Input Interface
Power Supply	
Rated Voltage	230V
Input Frequency	50Hz
Overall Power Consumption	≤10W
Installation Method	
Rail-Mounted Installation	
Environmental Requirements	
Operating Environment Humidity	25%~85%，no condensation
Operating Environment Temperature	-25℃~55℃
Storage Humidity	≤85%
Dimensions	
Size	72 x 100 x 68 mm(2.834 x 3.937 x 2.677 in)

3、Hardware Installation Instructions

3.1. Electrical Wiring Diagram



3.2. Safety Precautions

3.2.1. Personal Safety

● Live operation is strictly prohibited during installation. It is forbidden to install or remove cables with power on. When the cable core contacts the conductor, electric arcs, electric sparks or fire and explosion may occur, which can lead to fire or personal injury.

● When the equipment is powered on, irregular and incorrect operations may cause fire, electric shock or explosion, resulting in personal injury or property loss.

● It is strictly prohibited to wear watches, bracelets, bangles, rings, necklaces and other easily conductive objects during operation to avoid electric shock burns.

● Special insulated tools must be used during operation to avoid electric shock injury or short-circuit faults. The insulation voltage level must meet the requirements of local laws, regulations, standards and specifications.

● Special protective equipment must be used during operation, such as protective clothing, insulated shoes, goggles, safety helmets, insulated gloves, etc.

3.2.2. Electrical Safety

● Before making electrical connections, please ensure that the equipment is not damaged, otherwise electric shock or fire may occur.

● Irregular and incorrect operations may cause accidents such as fire or electric shock.

● During operation, it is necessary to prevent foreign objects from entering the equipment, otherwise it may lead to equipment short-circuit faults or damage, load power supply derating or power failure, and personal injury.

3.2.3. Environmental Requirements

● It is strictly prohibited to place the equipment in an environment with flammable and explosive gases or fumes, and any operations in such an environment are prohibited.

● It is strictly prohibited to store flammable and explosive materials in the equipment area.

● It is strictly prohibited to place the equipment near heat sources or fire sources, such as fireworks, candles, heaters or other heating equipment. Equipment heating may cause equipment damage or fire.

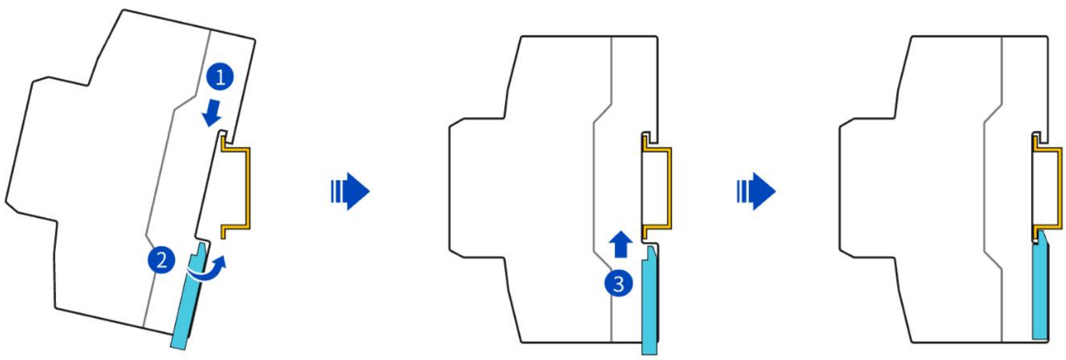
● The equipment should be installed in an area away from liquids. It is strictly prohibited to install it under positions that are prone to condensation, such as water pipes and air outlets; it is strictly prohibited to install it under positions that are prone to water leakage, such as air conditioning outlets, ventilation outlets, and computer room outlet windows, to prevent liquids from entering the equipment and causing equipment failure or short circuit.

3.2.4. Mechanical Safety

- For high-altitude operations, safety helmets, safety belts or waist ropes must be worn, which should be tied to firm and solid structural parts. It is strictly prohibited to hang on moving unstable objects or sharp-edged metals to prevent hook slipping and falling accidents.
- Tools must be complete and qualified through professional organization inspection. It is forbidden to use tools with scars, unqualified inspection or exceeding the inspection validity period. Ensure that the tools are firm and not overloaded.
- Drilling holes on the equipment is strictly prohibited. Drilling will damage the tightness, electromagnetic shielding performance, internal components and cables of the equipment. Metal chips generated by drilling entering the equipment will cause short circuits of the circuit board.

3.3. Installation Method

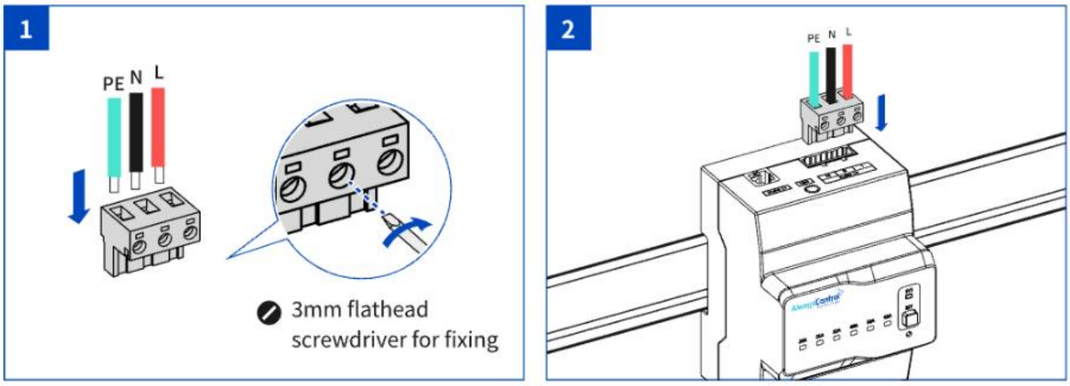
Rail-mounted installation: Insert Neuron III Lite into the 35mm standard rail from bottom to top, then press the buckle to fasten Neuron III Lite on the rail.



3.3.1. Steps for Connecting AC Power Cable

1. Connect the AC power cables L, N, PE to the power connector in sequence, and fix them with a 3mm flat-blade screwdriver.

2. Then, insert the power connector into the AC power input interface, ensuring that it is inserted in place and the connection is firm.



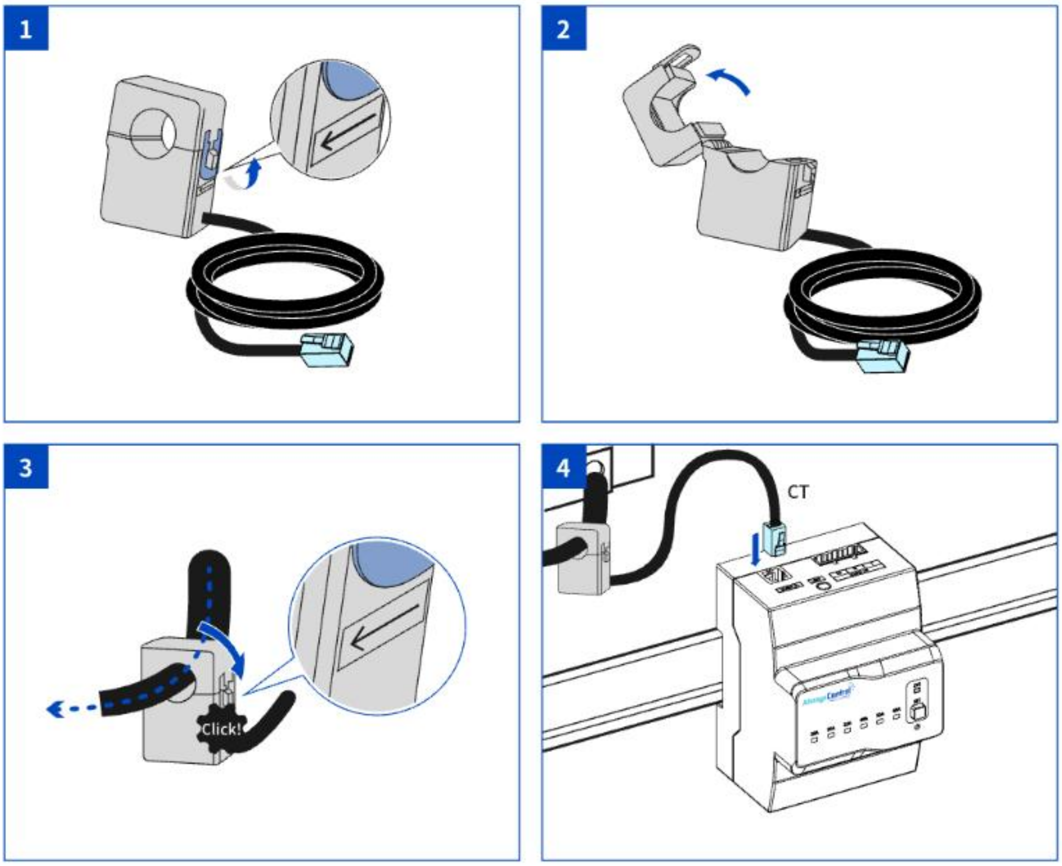
3.3.2. Steps for Connecting CT Loop

1. First, the CT loop needs to be installed according to the phase: the CT loop needs to be hung on the L wire.

2. When installing the CT, it is imperative to confirm that the current direction is consistent with the direction of the CT to avoid reverse connection, which may lead to incorrect current detection.

3. Open the buckle of the CT loop, place the wire in the central hole, and then fasten the buckle.

4. Finally, insert the RJ9 terminal of the CT loop into the input interface of the CT loop and ensure it is inserted in place.



3.3.3. Pre-Power-On Check

- Neuron III Lite has been reliably installed in place without looseness, offset or shaking, and there is no condensation or frost in the installation environment.
- All cables have been reliably connected without short circuits, open circuits or looseness. The CT loop matches the power phase, and the direction of the CT loop is correct.
- The routing of power cables and signal cables meets the requirements of strong and weak current routing and complies with the system routing plan.
- The cables are tied neatly and beautifully with uniform spacing, appropriate tightness and consistent direction.
- There are no redundant tapes, cable ties or other residues on the cables.

3.3.4. Power-On and Debugging of Neuron III Lite

- Before the first power-on operation of the equipment, professional personnel must accurately set the parameters. If operated by non-professional personnel, incorrect settings may occur, which may cause the equipment to fail to meet the requirements of the country or region where it is located and affect the normal operation of the equipment.

Please be sure to follow the above safety precautions to ensure the safety of the installation process and the long-term stable operation of the equipment.

4、Software Installation and Use

The mobile software provided by Always-control Technology aims to provide users with an intuitive and easy-to-operate platform to achieve efficient control and monitoring of the energy management system. The software supports multiple functions, including:

- Local Operation: Communicate with the terminal controller via Bluetooth to achieve off-grid control.
- Real-Time Data Monitoring: Instantly view system status and performance data.
- Device Control: Simple and flexible operation and configuration help improve management efficiency.

4.1. Software Installation

To make full use of Always-control Technology' energy management solutions, please install the latest version of the software according to the following steps:

- IOS: Open the App Store, search for N3 Lite and download it.
- Android: Open the link https://www.pgyer.com/charge-android to download.
- Or scan the QR code below to download:

App Store Download **Android Download**

4.2. User Interface Overview

After turning on Bluetooth on the mobile phone and launching the software, you need to allow the controller to connect to nearby devices. After entering the software, you will see the following interface. The software will automatically search for nearby available controller devices, and the number corresponds to the

SN(Figure 1)。

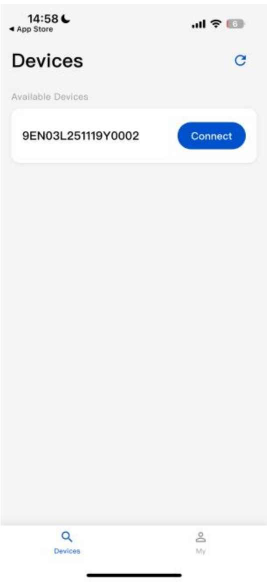


Figure 1

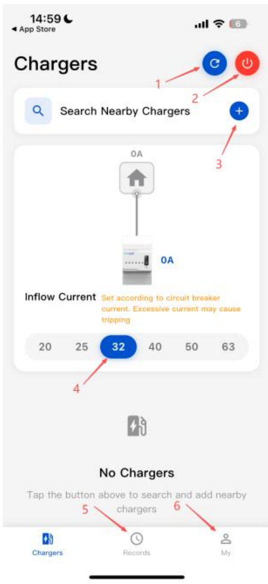


Figure 2

Click “Connect”to enter the terminal control page(Figure 2),which displays the data display page by default. The main functions of this page are:

1. Refresh current real-time data.
2. Disconnect the connection with the current controller terminal.

3. Search for and bind charging pile devices.
4. Set the maximum incoming current threshold.
5. Switch to view the historical charging records of the charging pile.
6. Switch the system language of the current software and update the version of the terminal controller.

4.3. Operation Guide

4.3.1. Device Search/Add/Delete

Click the “Search for nearby charging piles” button to enter the search interface(Figure 3).After the search is completed, you can see the list of returned charging pile devices (Figure 4).Click “Add” to add the charging pile device to the controller for management. After binding the device, the SYS light turns green, indicating normal operation. Device Deletion:(Figure 6),swipe right on the corresponding charging pile card to display “Delete”, click “Delete”to remove the current charging pile device from the controller.

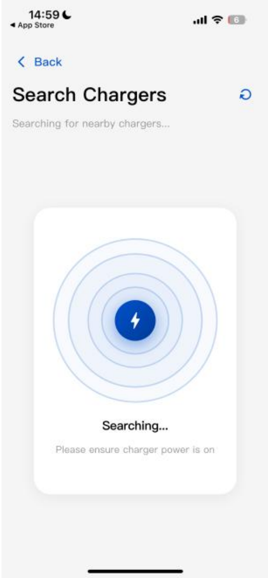


Figure 3

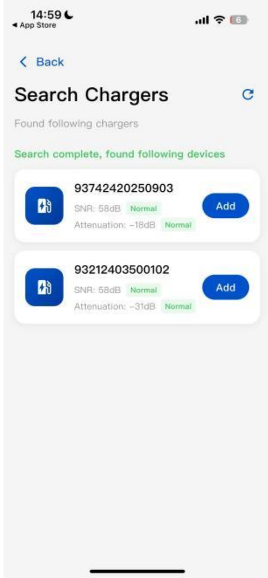


Figure 4

4.3.2. Load Balancing Monitoring Page

Figure 5

Figure 6

The interface in Figure 5above is the core dashboard of the home energy management system, integrating three core functions: real-time energy monitoring, dynamic load balancing (DLB) configuration, and charging pile device management. Users can not only intuitively view the real-time distribution of total household electricity consumption and charging load here, but more importantly, need to set the “maximum incoming current” threshold according to the household circuit specifications here. The system will automatically adjust the charging power based on this, realizing efficient charging on the premise of ensuring that the household circuit does not trip.

At the same time, users can view the operating status of all bound devices here and enter the details page for control.

1) Topology Diagram:

Intuitively displays the current household electricity topology, including charging piles, household loads, and total incoming current. Real-Time Readings: Users can monitor the current values of household loads and charging piles here. By monitoring the total incoming current, they can know whether there is an overload risk.

2) Maximum Incoming Current Setting:

Function Description: The values here (20A, 25A, 32A, 40A, 50A, 63A) represent the rated current of the main incoming air switch of the user's home.

Setting Method: Click the corresponding number on the APP to switch, or set it through the SET button.

Working Principle: The system will perform dynamic load balancing control according to this set value. When the power consumption of other household appliances (such as air conditioners, ovens, etc.) increases, the system will automatically reduce the power of the charging pile to ensure that the total current does not exceed this set value and prevent tripping.

3) Device List Area: Online Status Monitoring

Device Card: Each card represents a bound charging pile.

Key Information:

ID Number: The unique identification code of the device.

Connection Status: Displays the current status of the device (Online, Offline, Charging, Paused).

Real-Time Current: Displays the current charging current of the pile.

Operation: Click the card area to enter the detailed control page of the charging pile.

4.3.3. Charging Pile Device Management

After clicking the device card on the homepage, you will enter the independent control interface of a single charging pile. This interface fully covers the entire process from starting charging, real-time monitoring to ending settlement.

1. Status Detection and Control:(Figure 7)

Status Detection: The system will automatically detect whether the charging gun is correctly inserted into the vehicle interface.

Start Charging: Only when the screen displays“Charging Gun Connected”, the blue“Start Charging”button at the bottom will light up and be activated. After confirming that the connection is correct, click the “Start Charging” button, and the system will issue a command to start the device.

Stop Charging: To stop charging, click the red “Stop Charging” button at the bottom.

2. Real-Time Charging Monitoring:

After successful startup, the interface will automatically jump to the monitoring view (Figure 8)。

Visual Link: The charging current animation is displayed in the center of the screen, intuitively showing the process of the power grid charging the vehicle. Statistics Panel: The “Charging Duration” and “Charged Capacity (kWh)” are updated in real time at the bottom, allowing you to have a clear understanding of the charging status.

3. **Charging Records(Figure 9)**

After clicking “Stop Charging”, the system will automatically generate the charging record for this time. The total capacity (kWh) of this charging is displayed at the top. The list details the device ID, the specific start/end time, and the total duration.

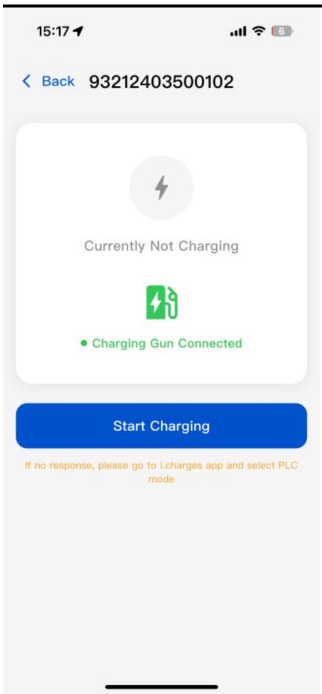


Figure 7

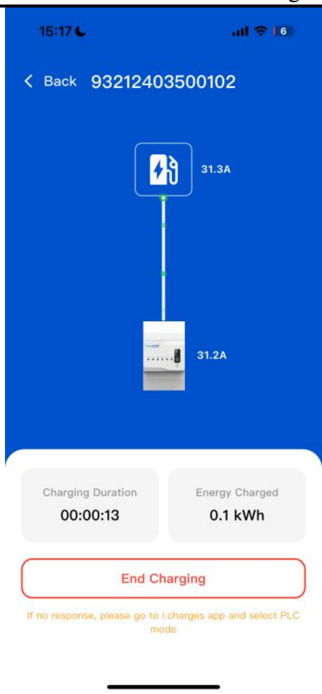


Figure 8

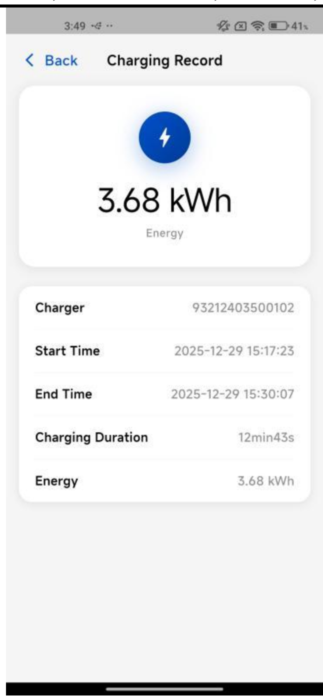


Figure 9

4.3.4. Historical Records

Switch to the “Records” page from the homepage to query the charging history records of the devices bound to the controller

(Figure 10)

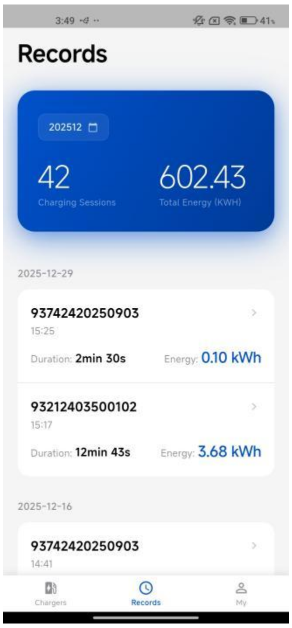


Figure 10

On the records page, you can view the historical number of charges and total charged capacity. Click the date to select different dates to filter out the charging records within the corresponding time period.

4.3.5. System Language Management and Version Update

Switch to “My” from the homepage to modify the current system language of the software (currently supporting Simplified Chinese, Traditional Chinese, English) and update the N3 Lite firmware version

(Figure 11).

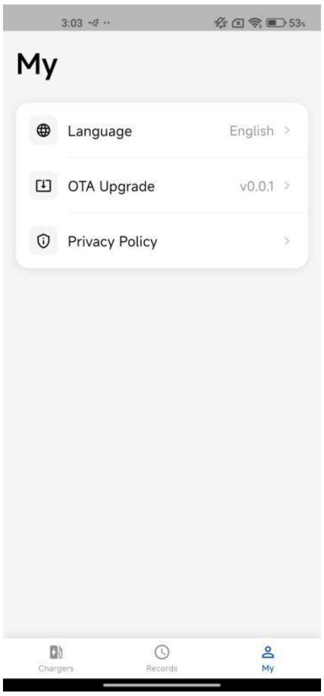


Figure 11

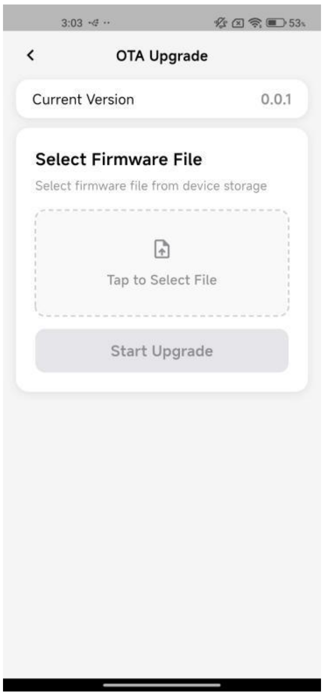


Figure 12

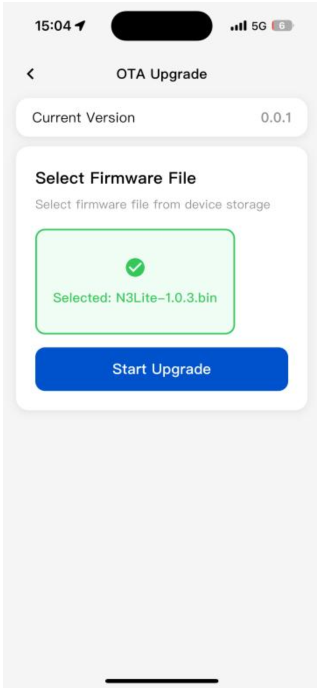


Figure 13

Click OTA Upgrade to enter the update page(Figure 12).The OTA upgrade page displays the current version of the controller. Click Select File to find the corresponding firmware upgrade package. After finding the suitable application firmware upgrade package, click Start Upgrade(Figure 13).

*Firmware Upgrade Package Format: The file name is N3Lite-1.0.3.bin, where “N3Lite” is the controller series name, the part after “_” is the updated version number, and the last “.bin” is the format of the executable file.

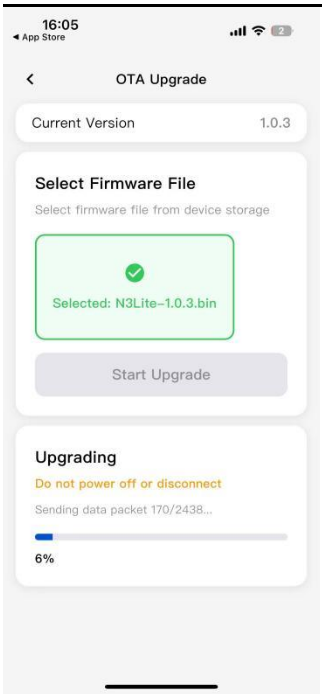


Figure 14

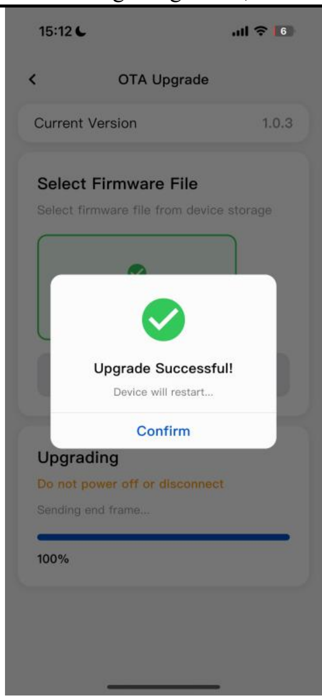


Figure 15

After selecting the corresponding firmware upgrade package, click the Start Upgrade button to start the update(Figure 14).Do not switch to other interfaces during the update, otherwise the update will stop and you need to select the file again. After the update is completed, the page will prompt "Upgrade Successful" (Figure 15).After the update is successful, the device will restart automatically, and the connection with the controller will be disconnected at this time(Figure 16).You can connect again after the controller completes the restart. After the connection is successful, switch to the corresponding OTA upgrade page to check that the controller version has been upgraded successfully(Figure 17).

Figure 16

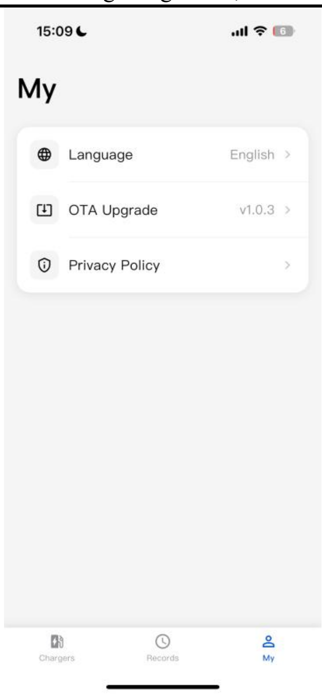


Figure 17

5、Notes

5.1. When Device Search Is Abnormal

During the device search process, after the search is completed, if there is no corresponding serial number for the searched device(Figure 4),you need to confirm whether the PLC module of the charging pile is installed correctly. **First, disconnect the power of the charging pile,** then unscrew the shell screws of the charging pile, open the shell, and confirm that the PLC module is installed correctly. **The PLC module is located at the upper left corner of the charging pile main boa**rd, which is a pluggable PLC module. Pull out the corresponding PLC module and reinsert it, then power on and search for the device again.

5.2. When Charging Pile Control Is Unresponsive

After binding the charging pile, insert the charging gun to prepare for charging, but clicking “Start Charging” has no response. At this time, you need to go to the i.Charger APP to find the corresponding charging pile, switch the current working mode of the charging pile to PLC, then switch back again, and click “Start Charging” to proceed.

5.3. Some APP Functions Are Locked During Charging Pile Operation

To ensure the safety of the charging process and the accuracy of the household Dynamic Load Balancing (DLB) algorithm, when any device is in the charging state, the system will automatically lock the following functions:

1. Modification of “Maximum Incoming Current” setting is prohibited Reason: During charging, the system needs to calculate the remaining available power in real time based on this value. Modification midway may lead to calculation errors, which may cause the risk of tripping of the main household switch.

2. Adding or deleting devices is prohibited Reason: Changes in the device list will change the power topology. To ensure the stability of communication and control, adding or deleting devices is not supported at this time.

3. Firmware upgrade (OTA) is prohibited Reason: OTA update requires the device to restart, which will force the interruption of the current charging control process. At this time, overload events sent cannot be monitored and processed.

Note: To perform the above operations, please stop the charging tasks of all devices first.

5.4. Equipment Maintenance

- Please contact professional personnel for operation. Non-professional personnel are not allowed to perform this operation to prevent personal injury or equipment damage.
- Before performing maintenance work, please power off the equipment first to ensure that the equipment is powered off before operating the equipment.
- Please use special protective equipment and special insulated tools to avoid electric shock injury or short-circuit faults.

Maintenance Content	Inspection Method	Maintenance Cycle
Equipment Operating Status	1.Check whether the equipment appearance is damaged or deformed.	Once every six months.

Electrical Connections	1.Check whether the cable connections are loose or disconnected. 2.Check whether the cables are damaged, focusing on checking whether the outer skin of the cables in contact with metal surfaces has cuts.	Six months after the first commissioning. Once every six months to one year thereafter.

6、Contact Information

We are committed to providing you with high-quality products and services. If you have any questions or need help during use, please feel free to contact us.

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