AUTEL

Energy Management System

Installation and Operation Manual

(EU)

Revision Log

Version	Date	Rationale
V1.0	Apr 25, 2023	Initial version.
V1.1	May 25, 2023	Added a compatible energy meter. Modified the maximum wire length between the primary charger and the meter.
V2.0	Sept. 19, 2023	Optimized the structure. Added PV Hybrid mode w/ multiple chargers. Added EMS mode.
V2.1	Dec. 8, 2023	Added a Wi-Fi connection option for connecting primary charger to router. The connection between primary charger and router can be accomplished using either an Ethernet cable or Wi-Fi.
V3.0	Jul. 20, 2024	Added the Energy Management System Solution for AC Ultra, AC Compact, DC Compact, DC Fast and other different usage scenarios.

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Autel will not be liable for any direct, special, incidental, indirect damages or any economic consequential damages (including the loss of profits).

IMPORTANT

Before installing and operating the Autel Energy Management System, please read this manual carefully, paying extra attention to the important notes.

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Contents

1 Using This Manual

This manual is intended to outline the Energy Management System Solution for Autel EU model MaxiChargers — AC Wallbox, AC Compact, AC Ultra, DC Compact, and DC Fast. It describes the operating modes supported by the Autel Energy Management System as well as the installation and configuration instructions.

This document is intended for the following:

- Owners of Autel EU model AC/DC MaxiChargers — AC Wallbox, AC Compact, AC Ultra, DC Compact, and DC Fast
- Certified electricians/installers

1.1 Conventions

The following conventions are used:

1.1.1 Bold Text

Bold text is used to highlight selectable items such as buttons and menu options.

1.1.2 Notes and Important Messages

NOTE
Provides helpful information such as additional explanations, tips, and comments.

IMPORTANT
Reminds you that you must follow the instructions to prepare, set up, configure, and operate.

1.1.3 Hyperlinks

Hyperlinks are available in electronic documents. Blue italic text indicates a selectable hyperlink, and blue underlined text indicates a website link or an email address link.

1.1.4 Illustrations

Illustrations, especially the screenshots of the interface used in this document are for reference only. The actual product and screens may differ.

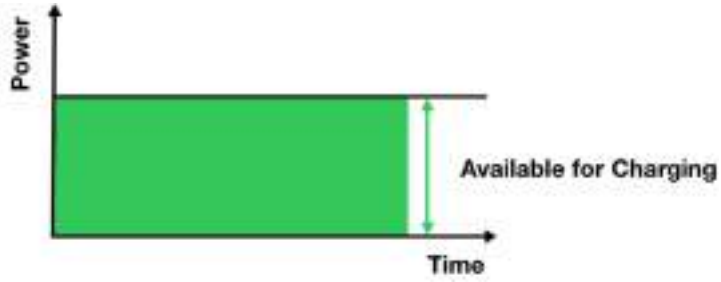
2 Energy Management System

The Autel Energy Management System offers four operating modes. You can select a mode based on the different usage scenarios.

2.1 Operating Modes

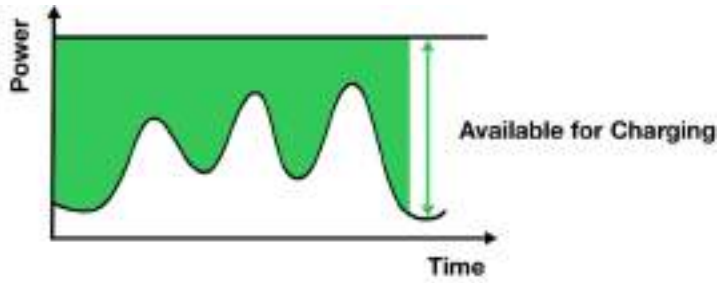
A. DLB Mode

The purpose of DLB mode is to achieve the fastest charging by maximizing power efficiency for the power allocated to the chargers and keeping the system power within a specific range.



B. ALM Mode

ALM mode provides consistent charging of chargers and other loads. The difference between ALM mode and DLB mode is that ALM mode manages load power and charger power at the same time using an external energy meter.



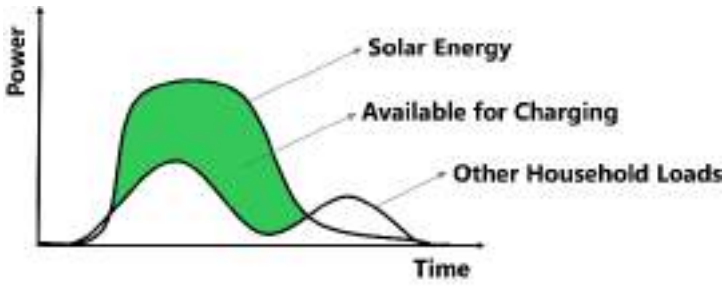
C. PV Hybrid Mode

PV Hybrid mode is achieved using solar energy. In PV Hybrid mode, the renewable electricity will be prioritized for household loads, and the surplus renewable electricity will be provided for your chargers to charge vehicles.

There are three charging modes available to meet your diversified charging demands.

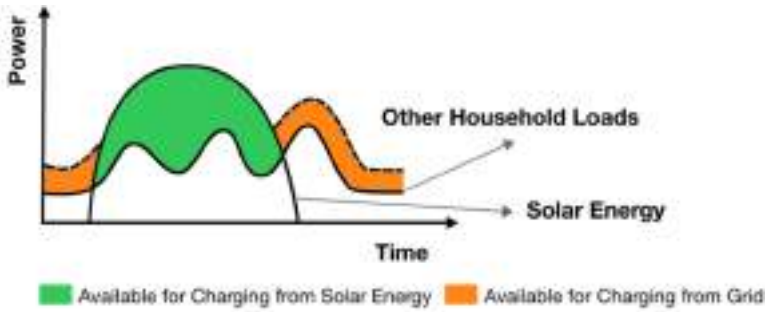
1) Full Green Charging Mode

The primary charger will always dynamically allocate the surplus renewable electricity to all chargers. No grid power will be provided even if the surplus renewable electricity is insufficient.



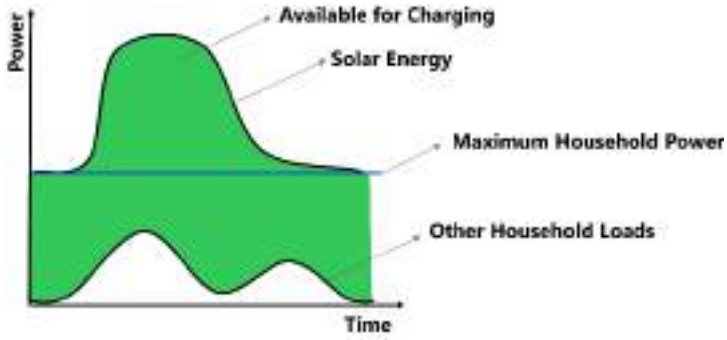
2) Green Priority Charging Mode

When the surplus renewable electricity is more than the sum of the minimum charging power of all chargers, the surplus renewable electricity will be dynamically allocated to all chargers through the primary charger. When the surplus renewable electricity is less than the sum of the minimum charging power of all chargers, the grid will provide extra power to meet the minimum charging power required by the chargers, and all chargers will charge at their minimum charging power.



3) Speed Priority Charging Mode

The chargers will receive power from both the solar energy and the grid power. After supplying power to other household loads, the surplus solar energy and grid power will be utilized to charge the chargers.



D. EMS Mode

In this mode, the third-party EMS assumes the role of the Controller, while the charger operates as the Receiver, adhering to power control commands issued by the EMS. The third-party EMS is responsible for load balancing and managing the power output of all Receivers.

2.2 Grouping Principle

Scenario	Primary Charger	Secondary Charger
AC Wallbox/AC Compact	AC Wallbox/AC Compact	AC Wallbox/AC Compact
AC Ultra	AC Ultra	AC Ultra
DC Compact/DC Fast	DC Compact/DC Fast	DC Compact/DC Fast
AC Ultra + AC Wallbox/AC Compact	AC Ultra	AC Wallbox/AC Compact
DC Compact/DC Fast + AC Wallbox/AC Compact	DC Compact/DC Fast	AC Wallbox/AC Compact

NOTE

1. The DLB, ALM, and PV Hybrid mode will be set on the primary charger.
2. For EMS mode, the charger acts as the secondary charger, and the operating mode will be set on every charger grouped up.
3. For DC Compact/DC Fast, PV Hybrid mode is not supported yet.

2.3 General Features

The table below shows the general features of the operating modes for AC Wallbox and AC Compact.

General Features of the Operating Modes

Item	DLB Mode	ALM Mode
Primary Charger	1	1
Secondary Charger	Max. 7	Max. 7
Hardware Connection Between Charger and Router	Wi-Fi/Ethernet cable	Wi-Fi/Ethernet cable (For multiple chargers.)
Communications Protocol Between Primary Charger and Meter	N/A	Modbus
Hardware Connection Between Primary Charger and Meter	N/A	RS485 cable
Maximum Length of Ethernet Cable	100 m (328 ft.)	100 m (328 ft.) (For multiple chargers.)
Maximum Length Between the Wiring of Primary Charger and Meter	N/A	200 m (656 ft.)

Item	PV Hybrid Mode	EMS Mode
Primary Charger	1	N/A
Secondary Charger	Max. 7	N/A
Hardware Connection Between Charger and Router	Wi-Fi/Ethernet cable (For multiple chargers.)	Wi-Fi/Ethernet cable
Communications Protocol Between Primary Charger and Meter	Modbus	N/A
Hardware Connection Between Primary Charger and Meter	RS485 cable	N/A
Maximum Length of Ethernet Cable	100 m (328 ft.) (For multiple chargers.)	100 m (328 ft.)
Maximum Length Between the Wiring of Primary Charger and Meter	200 m (656 ft.)	N/A

The table below shows the general features of the operating modes for AC Ultra, DC Compact, DC Fast and the scenarios including AC Ultra + AC Wallbox/AC Compact and DC Compact/DC Fast + AC Wallbox/AC Compact.

General Features of the Operating Modes

Item	DLB Mode	ALM Mode
Primary Charger	1	1
Secondary Charger	Max. 40	Max. 40
Hardware Connection Between Charger and Router	Wi-Fi/Ethernet cable	Wi-Fi/Ethernet cable (For multiple chargers.)
Communications Protocol Between Primary Charger and Meter	N/A	Modbus
Hardware Connection Between Primary Charger and Meter	N/A	RS485 cable
Maximum Length of Ethernet Cable	100 m (328 ft.)	100 m (328 ft.) (For multiple chargers.)
Maximum Length Between the Wiring of Primary Charger and Meter	N/A	200 m (656 ft.)

Item	PV Hybrid Mode	EMS Mode
Primary Charger	1	N/A
Secondary Charger	Max. 40	N/A
Hardware Connection Between Charger and Router	Wi-Fi/Ethernet cable (For multiple chargers.)	Wi-Fi/Ethernet cable
Communications Protocol Between Primary Charger and Meter	Modbus	N/A
Hardware Connection Between Primary Charger and Meter	RS485 cable	N/A
Maximum Length of Ethernet Cable	100 m (328 ft.) (For multiple chargers.)	100 m (328 ft.)
Maximum Length Between the Wiring of Primary Charger and Meter	200 m (656 ft.)	N/A

2.4 Physical Devices Needed

Physical Devices Needed

Operating Mode	Devices
DLB Mode	• Autel AC/DC MaxiChargers • Router • Type A RCDs or equivalent electrical leakage protectors • Ethernet cable (Optional)
ALM Mode w/Single Charger	• Autel AC/DC MaxiCharger • Energy meter • Type A RCD or an equivalent electrical leakage protector • RS485 cable
ALM Mode w/Multiple Chargers	• Autel AC/DC MaxiChargers • Energy meter • Router • Type A RCDs or equivalent electrical leakage protectors • Ethernet cable (Optional) • RS485 cable
PV Hybrid Mode w/Single Charger	• Autel AC/DC MaxiCharger • Energy meter • Type A RCD or an equivalent electrical leakage protector • RS485 cable • PV panel • PV inverter
PV Hybrid Mode w/Multiple Chargers	• Autel AC/DC MaxiChargers • Energy meter • Router • Type A RCDs or equivalent electrical leakage protectors • Ethernet cable (Optional) • RS485 cable • PV panel • PV inverter

Operating Mode	Devices
EMS Mode	• Autel AC/DC MaxiCharger • EMS controller • Router or switch • Type A RCD or an equivalent electrical leakage protector • Ethernet cable (Optional)

2.5 App for Configuration

The Autel Energy Management System can be configured via either the Autel Charge app or the Autel Config app.

Download the Autel Charge app by scanning the QR code below or directly from the Apple App Store or Google Play store, depending on the mobile device you are using.

NOTE
The Autel Charge app is used to illustrate the examples in this manual.

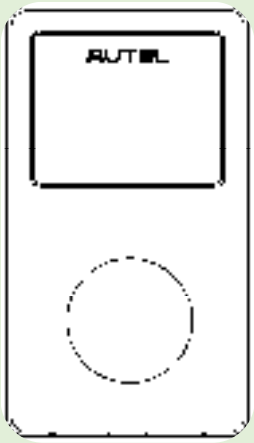
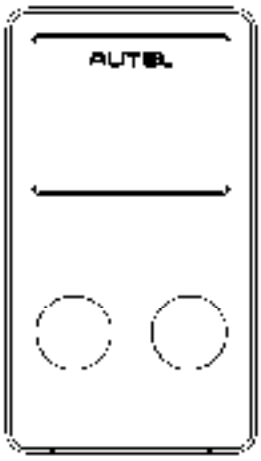
3 Installation

3.1 System Diagram

NOTE

1. To comply with relevant electric leakage protection standards, please use at least a Type A RCD or an equivalent electrical leakage protector that complies with local standards for each MaxiCharger.
2. Installation must be performed by qualified personnel in accordance with local regulations.

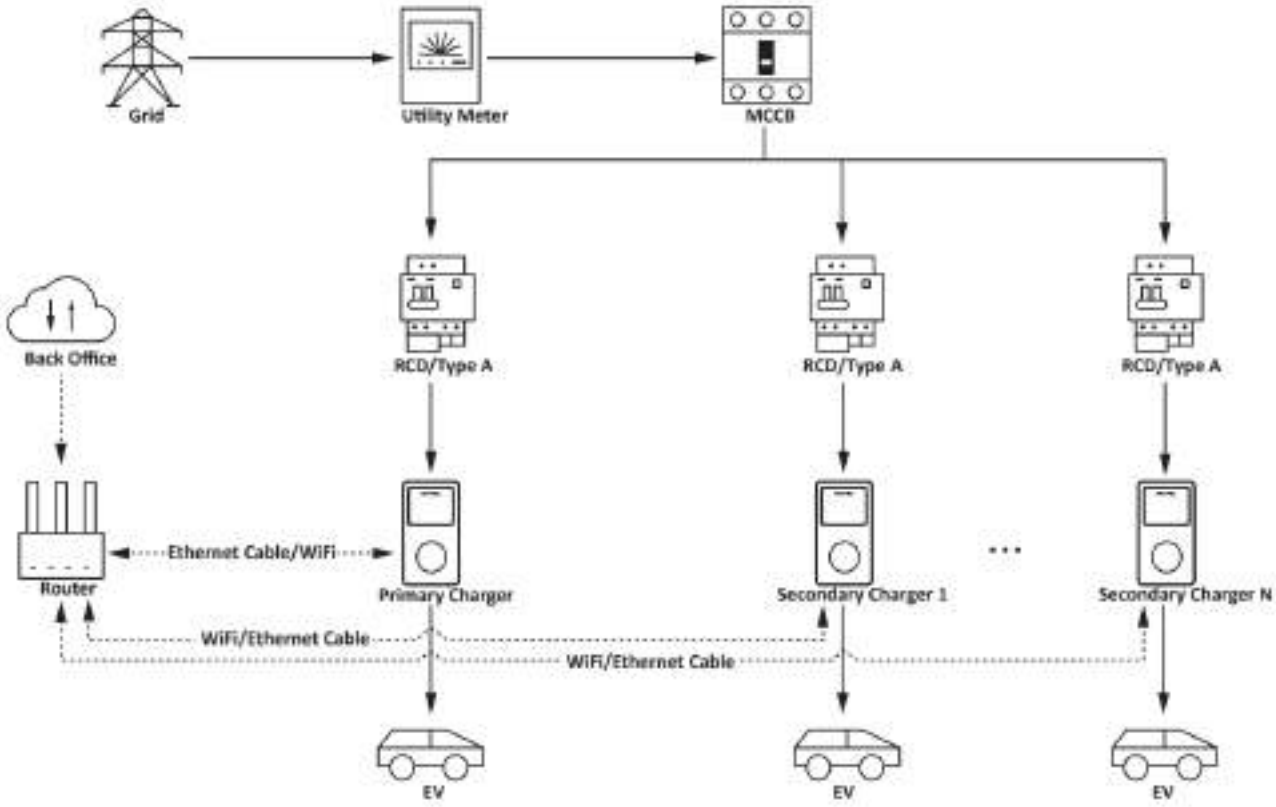
The figures below are used to describe different charger models.

Figure	Description
	AC Wallbox/AC Compact
	AC Ultra/DC Compact/DC Fast

3.1.1 DLB Mode

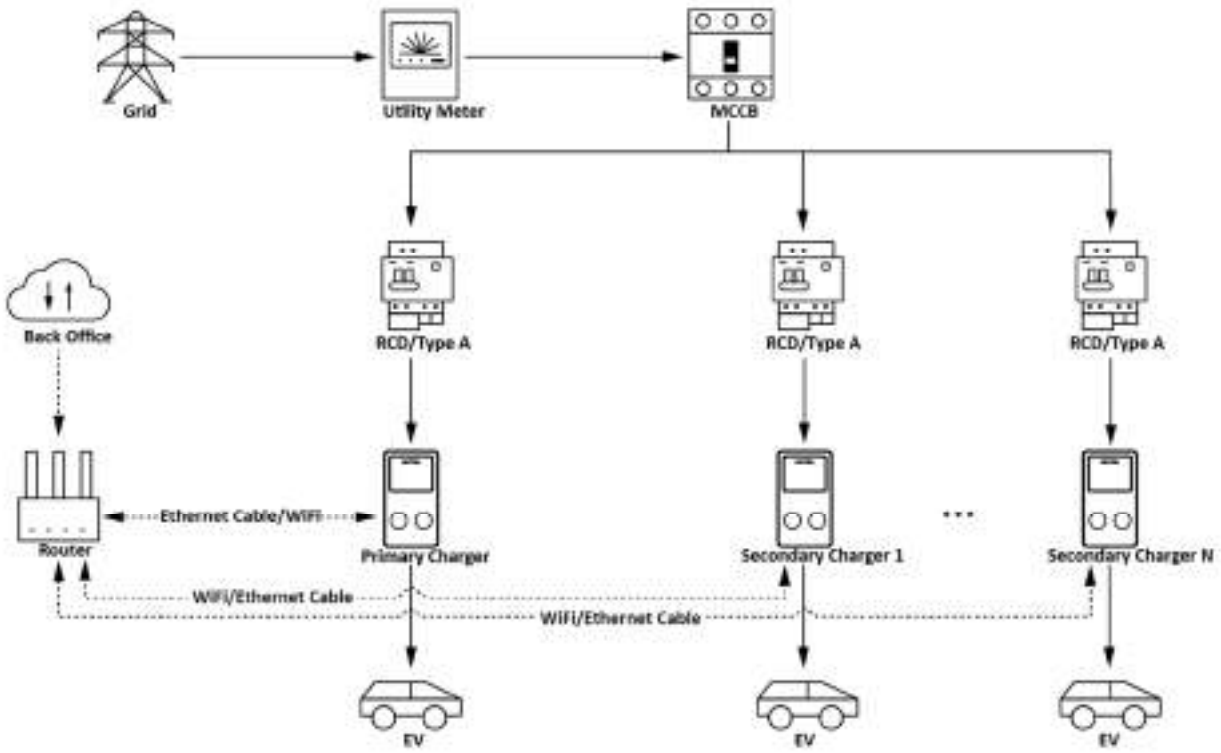
DLB mode is implemented when there are multiple chargers and no other loads share the power. To use DLB mode, ensure that all prerequisites are met according to the system diagram.

- **For AC Wallbox/AC Compact**



DLB Mode System Diagram

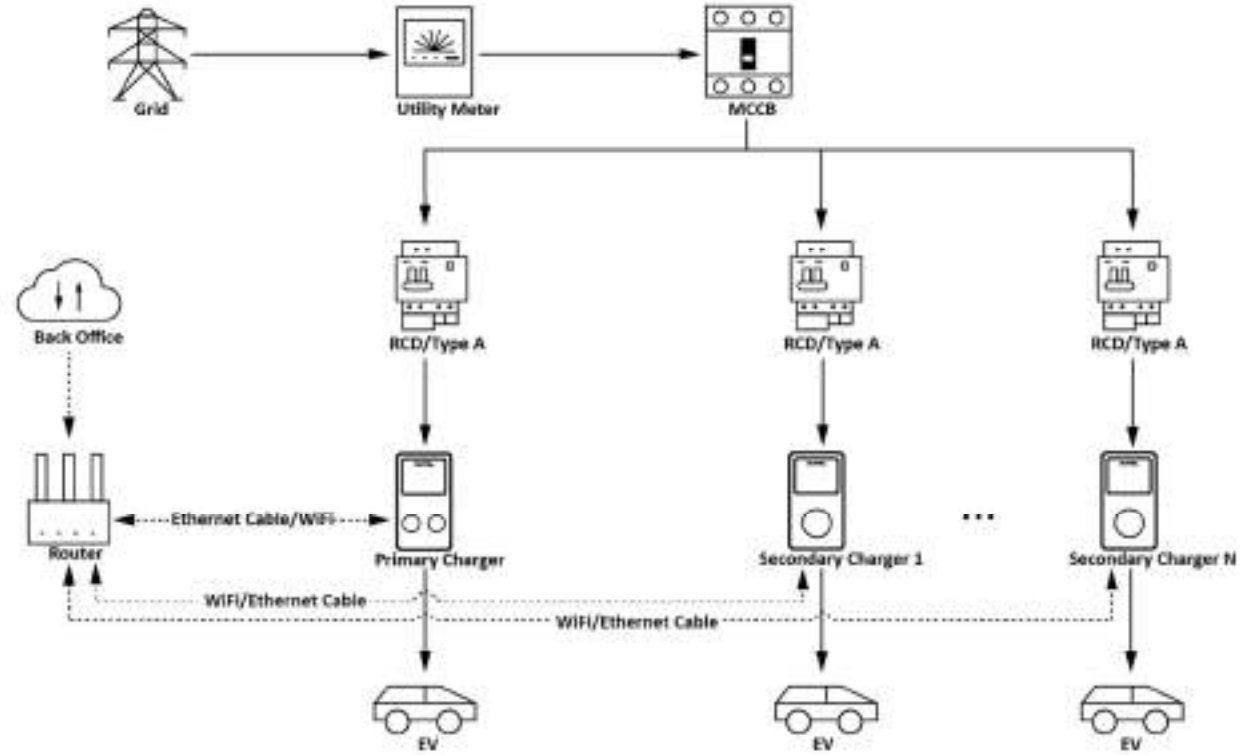
➢ **For AC Ultra/DC Compact/DC Fast**



DLB Mode System Diagram

➢ **For AC Ultra + AC Wallbox/AC Compact**

For DC Compact/DC Fast + AC Wallbox/AC Compact

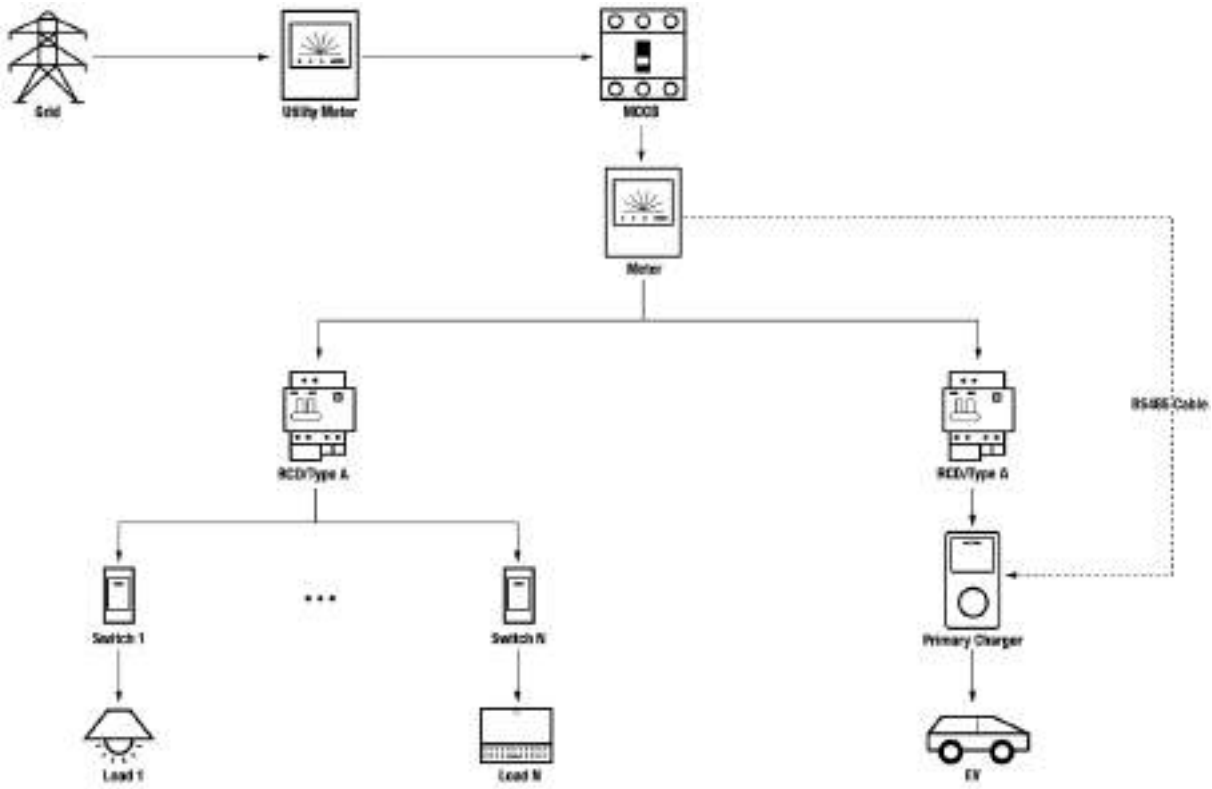


DLB Mode System Diagram

3.1.2 ALM Mode w/Single Charger

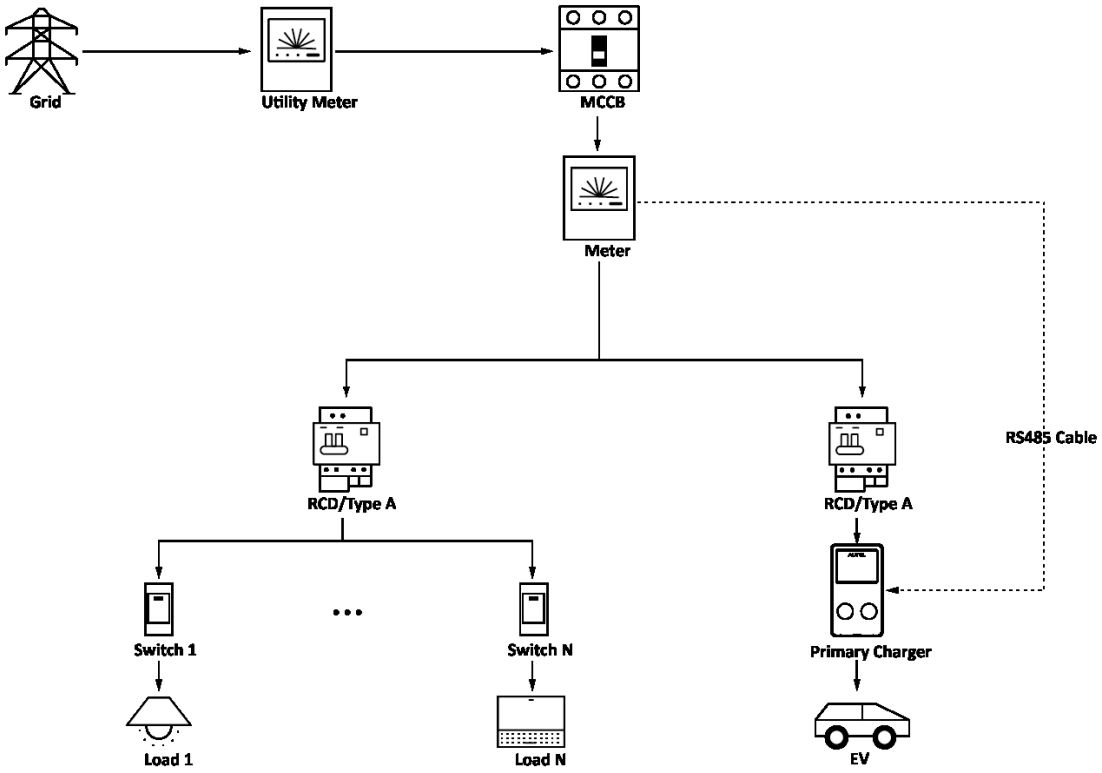
ALM mode w/single charger is suitable for cases where there is a single charger sharing power with other loads. To use ALM mode w/single charger, ensure that all prerequisites are met according to the system diagram.

- **For AC Wallbox/AC Compact**



ALM Mode System Diagram (w/Single Charger)

➢ For AC Ultra/DC Compact/DC Fast

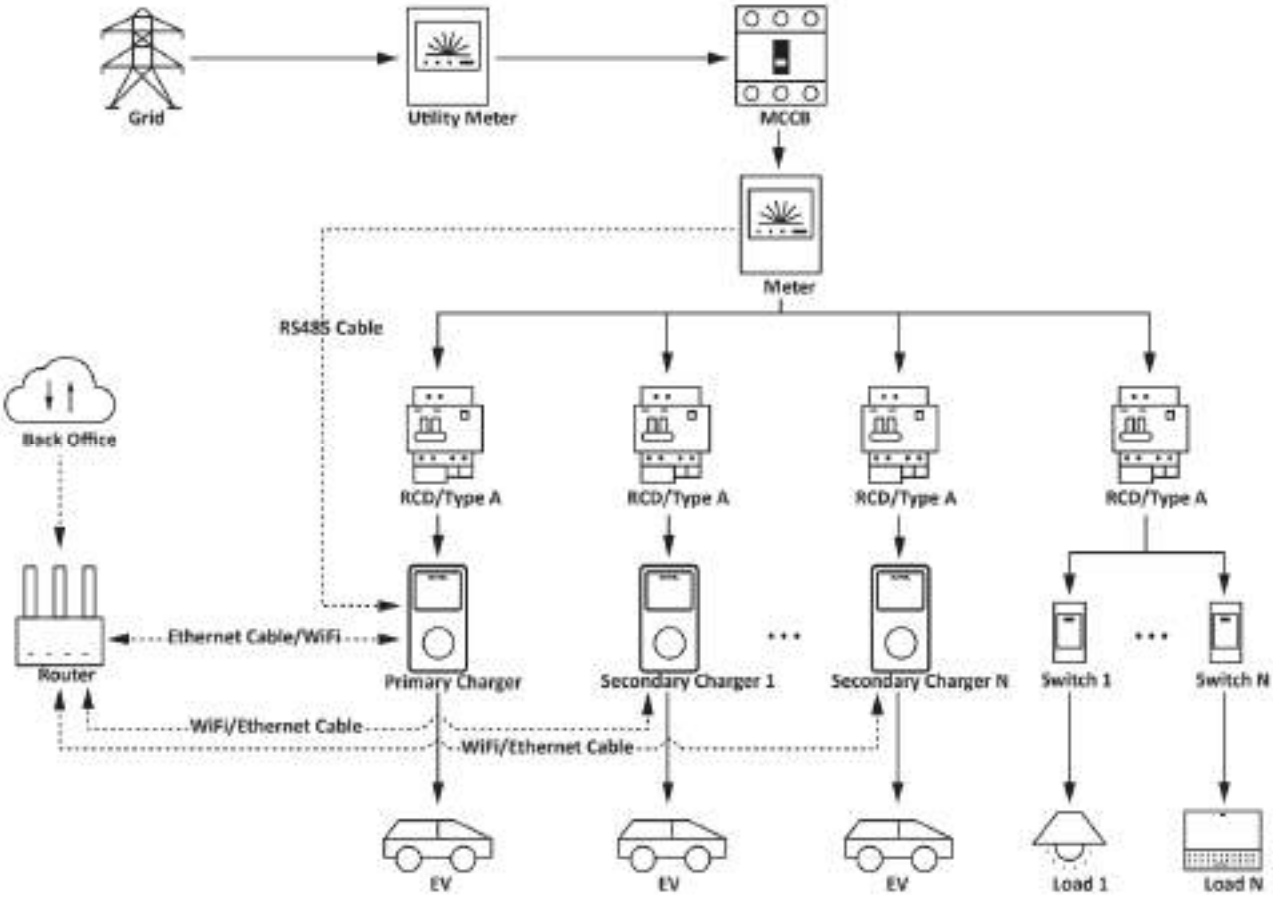


ALM Mode System Diagram (w/Single Charger)

3.1.3 ALM Mode w/Multiple Chargers

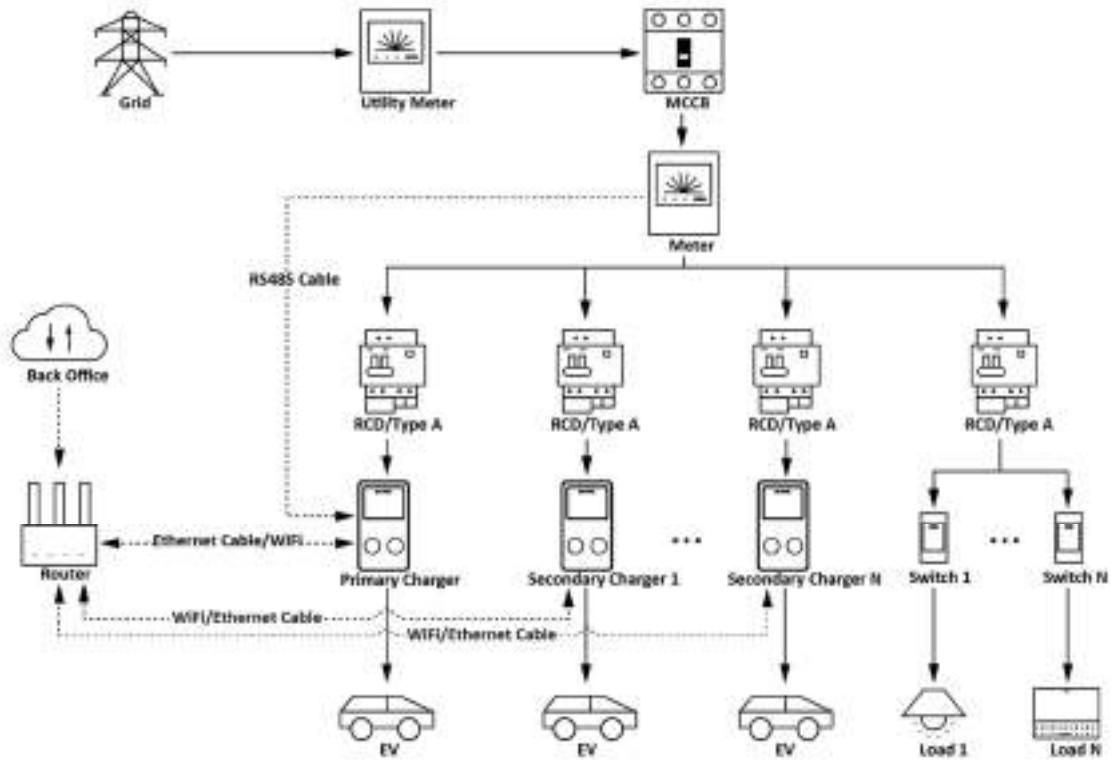
ALM mode w/multiple chargers is suitable for cases where there are multiple chargers sharing power with other loads. To use ALM mode w/multiple chargers, ensure that all prerequisites are met according to the system diagram.

- **For AC Wallbox/AC Compact**



ALM Mode System Diagram (w/Multiple Chargers)

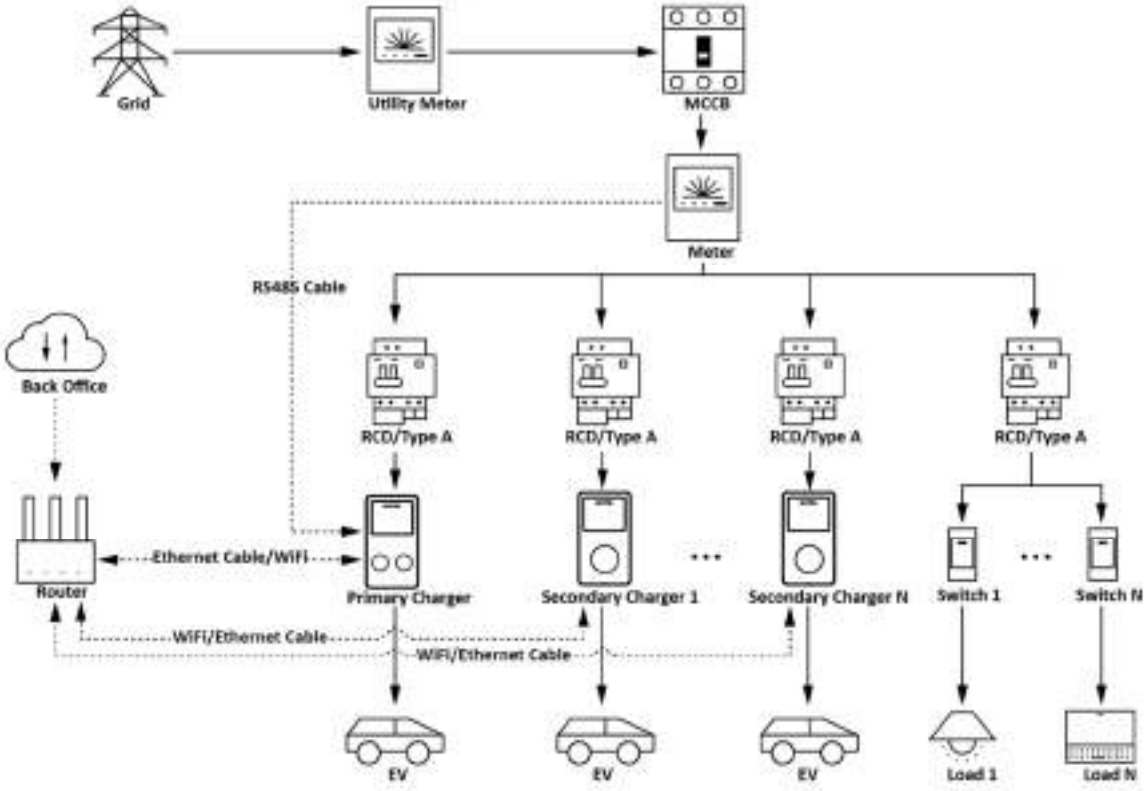
➢ **For AC Ultra/DC Compact/DC Fast**



ALM Mode System Diagram (w/Multiple Chargers)

➢ **For AC Ultra + AC Wallbox/AC Compact**

For DC Compact/DC Fast + AC Wallbox/AC Compact

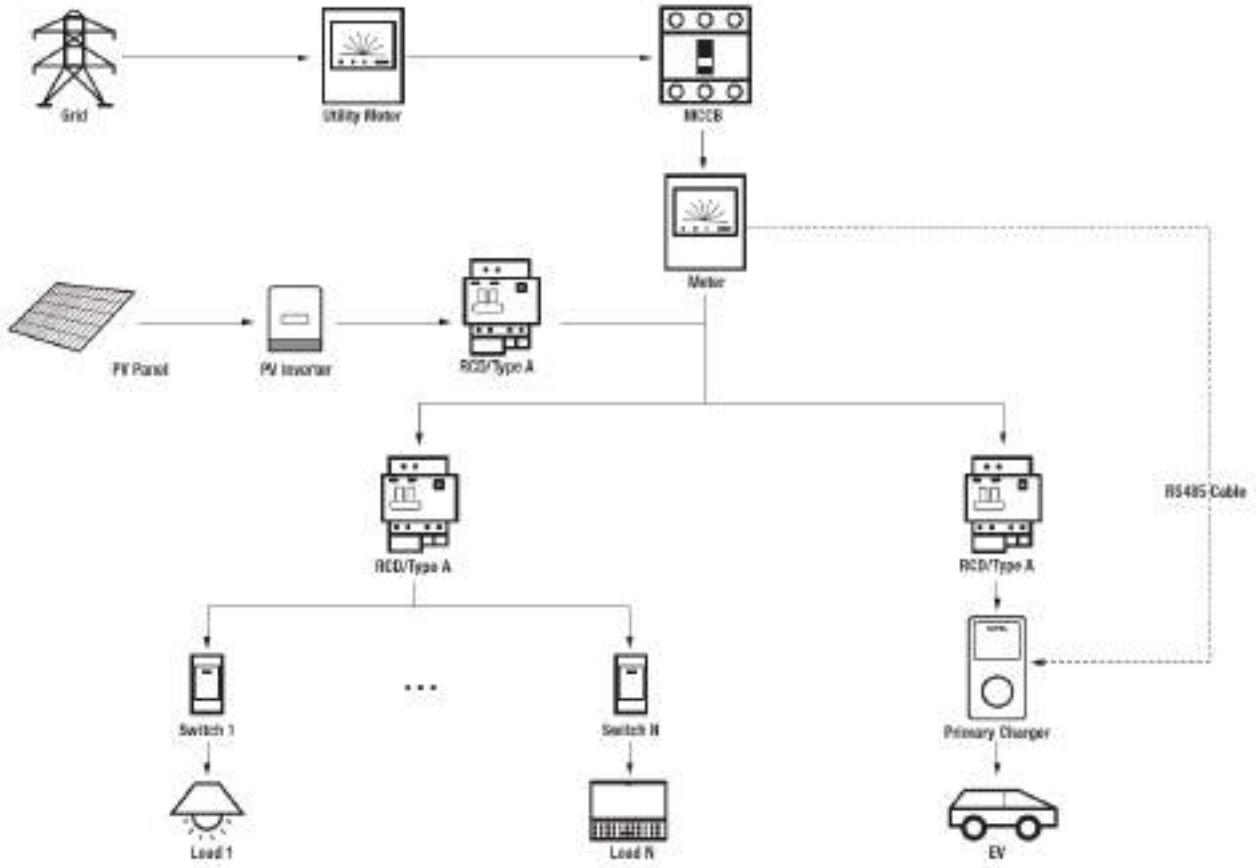


ALM Mode System Diagram (w/Multiple Chargers)

3.1.4 PV Hybrid Mode w/Single Charger

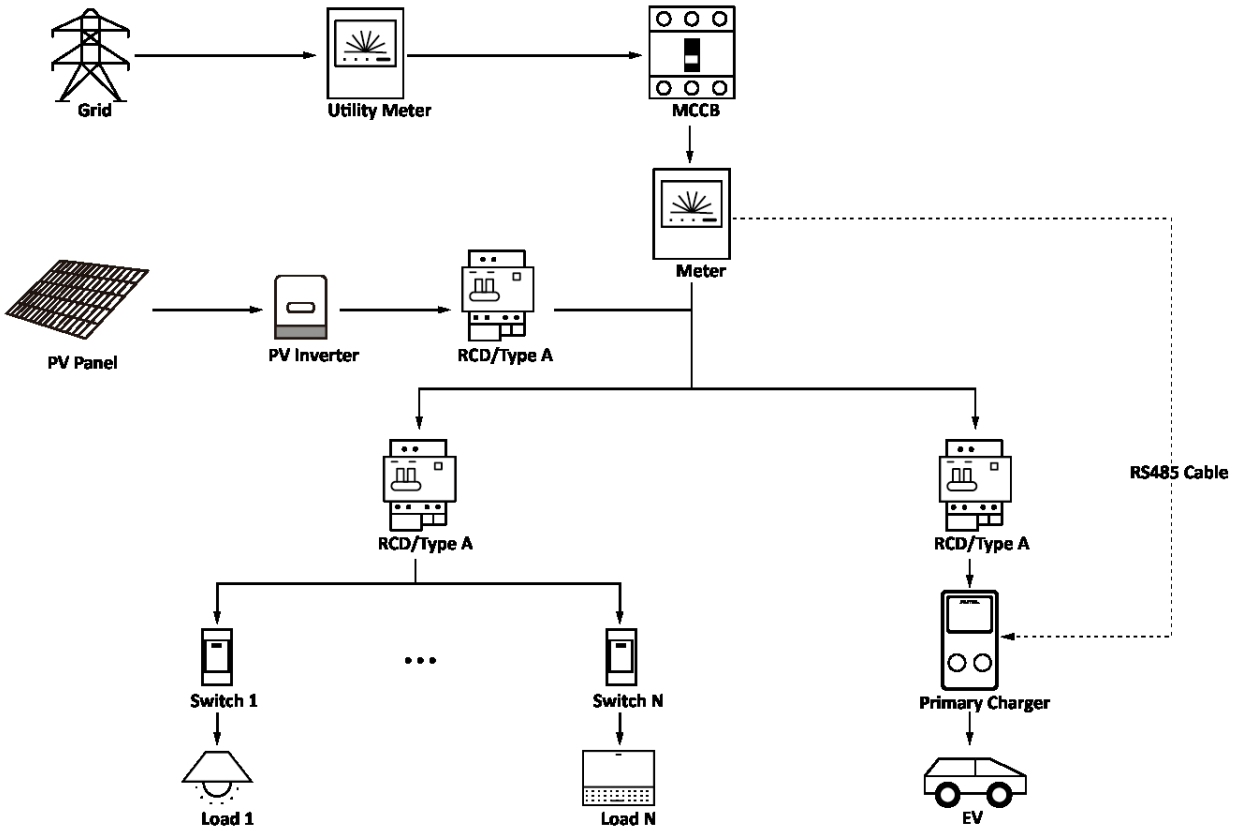
PV Hybrid mode w/single charger is suitable for cases where solar energy and electricity are used at the same time, and the solar energy is used preferentially to supply power for the charger and other loads.

- **For AC Wallbox/AC Compact**



PV Hybrid Mode System Diagram (w/Single Charger)

➢ For AC Ultra

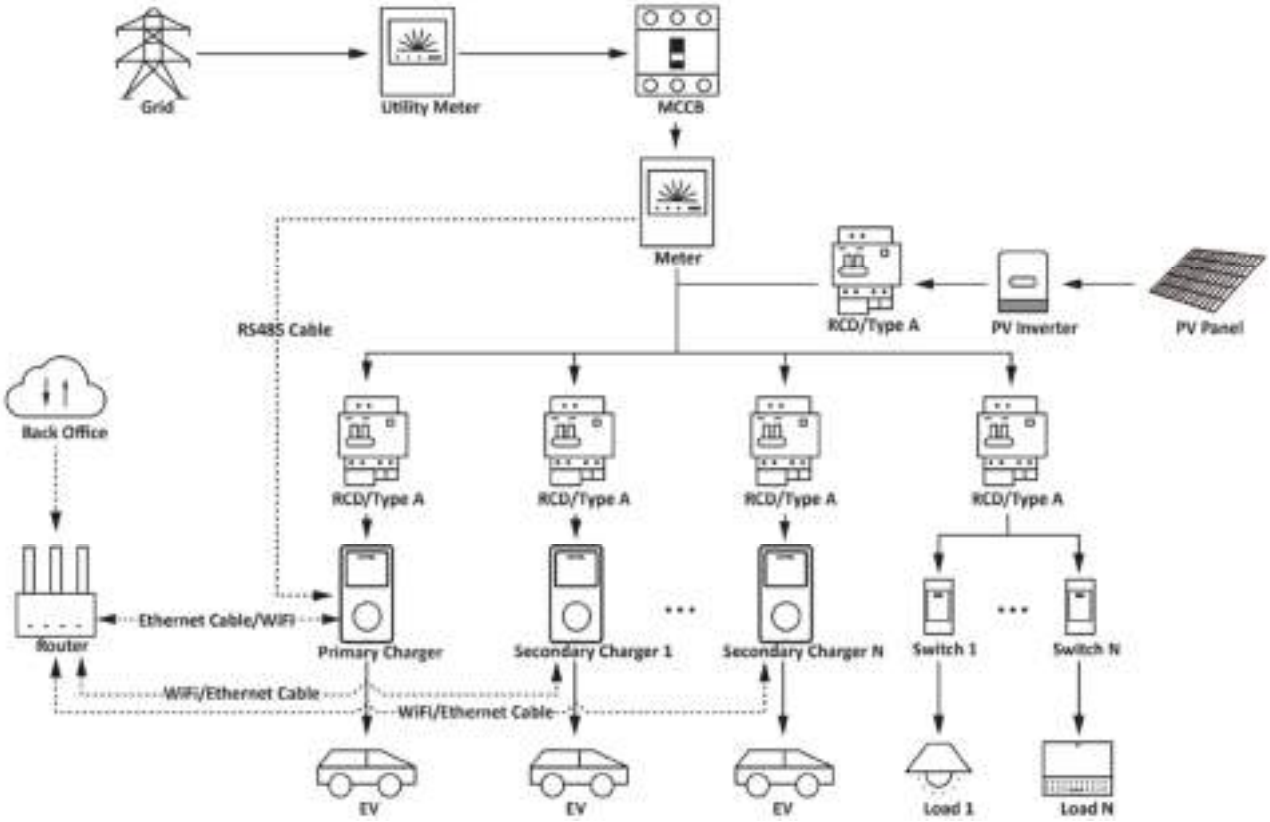


PV Hybrid Mode System Diagram (w/Single Charger)

3.1.5 PV Hybrid Mode w/Multiple Chargers

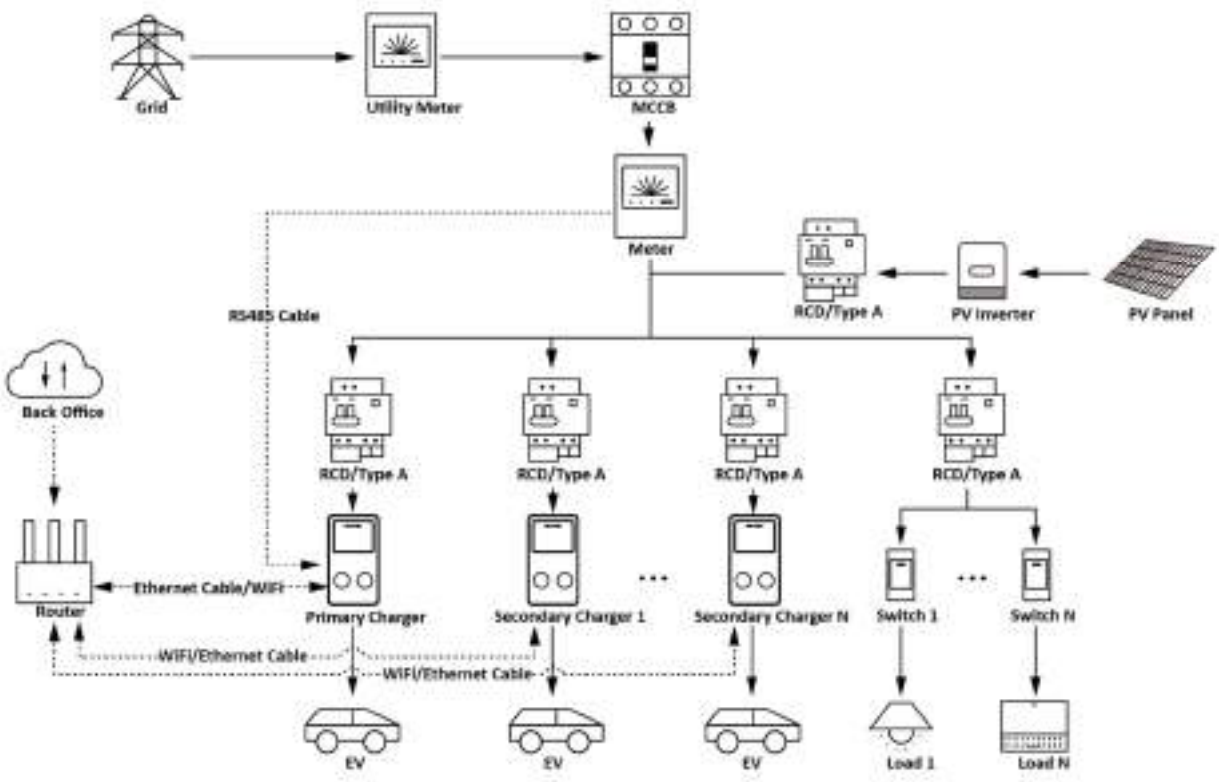
PV Hybrid mode w/multiple chargers is suitable for cases where solar energy and electricity are used at the same time, and the solar energy is used preferentially to supply power for multiple chargers and other loads.

- **For AC Wallbox/AC Compact**



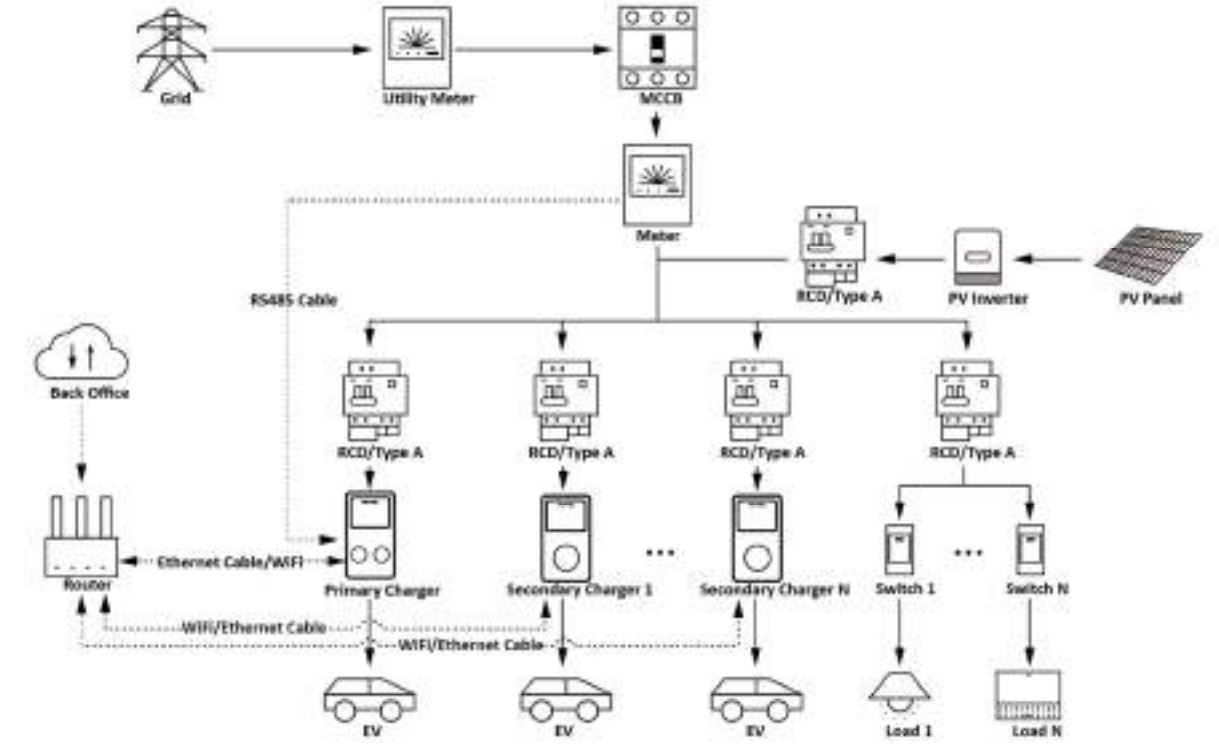
PV Hybrid Mode System Diagram (w/Multiple Chargers)

➢ **For AC Ultra**



PV Hybrid Mode System Diagram (w/Multiple Chargers)

➢ **For AC Ultra + AC Wallbox/AC Compact**

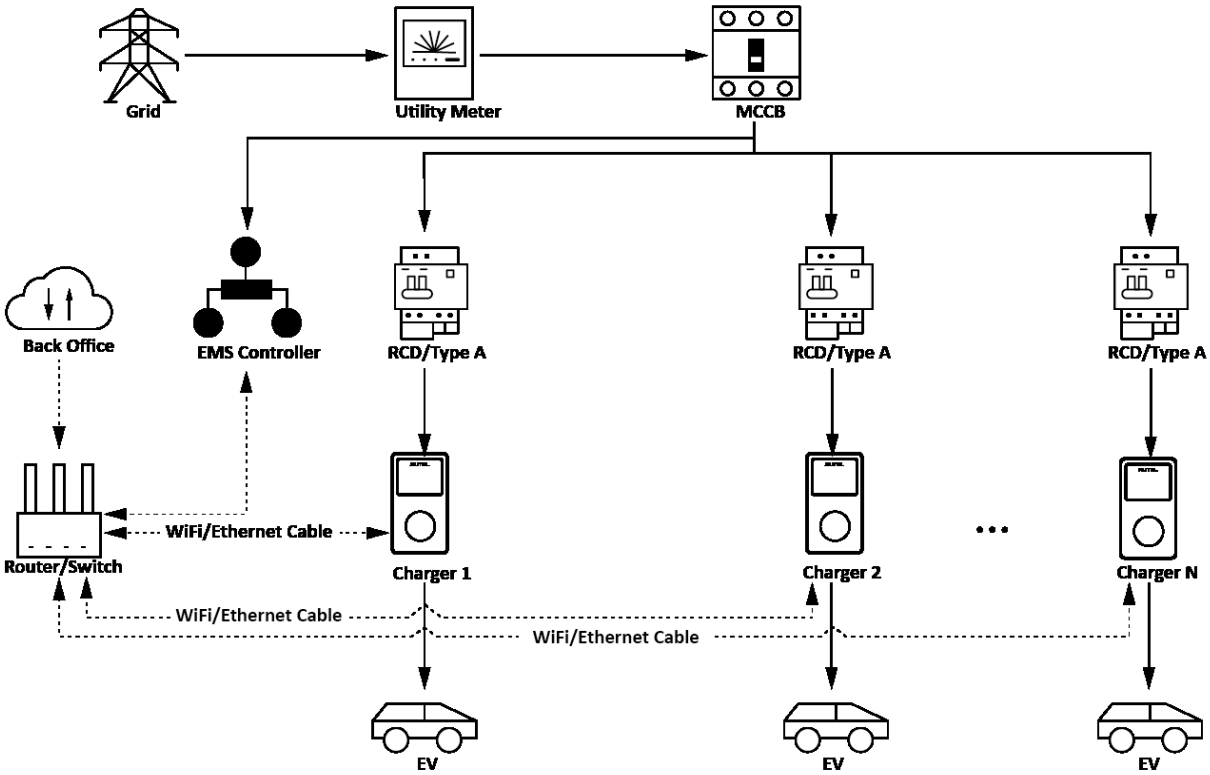


PV Hybrid Mode System Diagram (w/Multiple Chargers)

3.1.6 EMS Mode

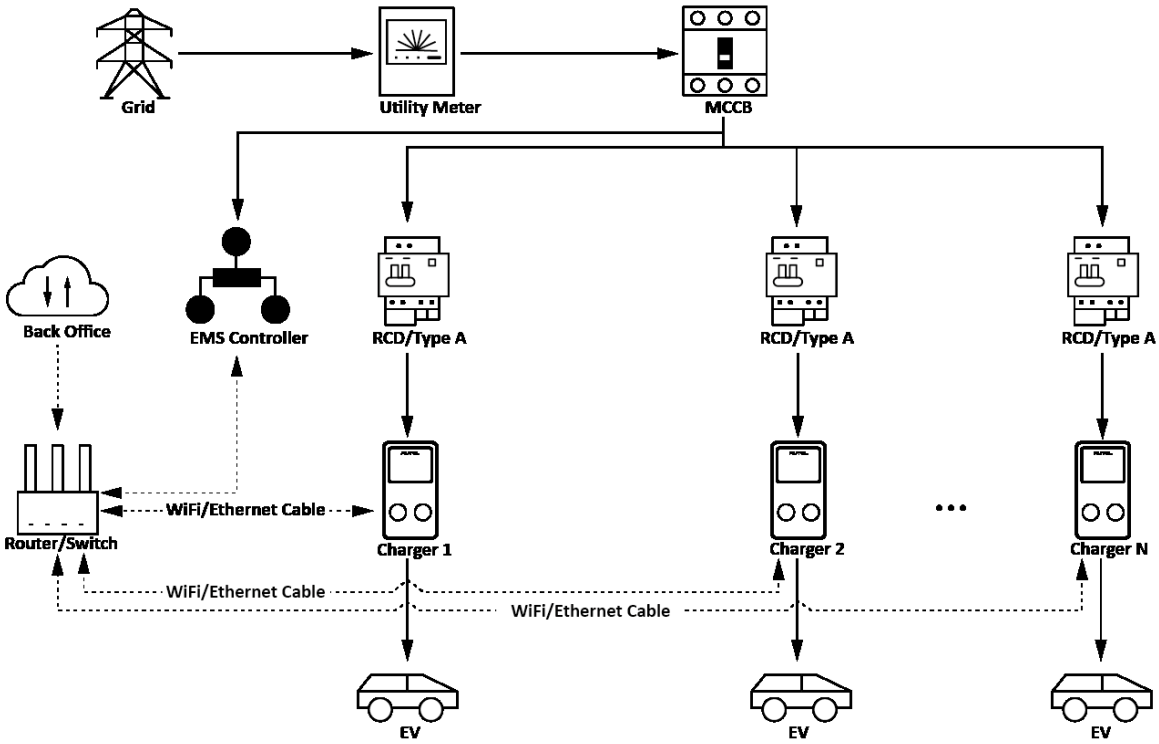
Integrating EMS with the charger allows the EMS to remotely control the charger using the Modbus TCP protocol. In this mode, all requests are initiated by the EMS, and the charger responds accordingly.

- **For AC Wallbox/AC Compact**



EMS Mode System Diagram

➢ For AC Ultra/DC Compact/DC Fast



EMS Mode System Diagram

3.2 Wiring Ethernet Cable

Before proceeding with the installation, we assume that you have already installed other devices. Therefore, this guide will only cover the necessary installation steps that follow.

3.2.1 For AC Wallbox

Both the primary charger and its secondary chargers need to be connected to the same LAN/WLAN:

1. The primary charger can establish a LAN/WLAN connection through an Ethernet cable or Wi-Fi (refer to *3.3.1*). For the sake of a more stable network, we recommend using an Ethernet cable to establish this connection.

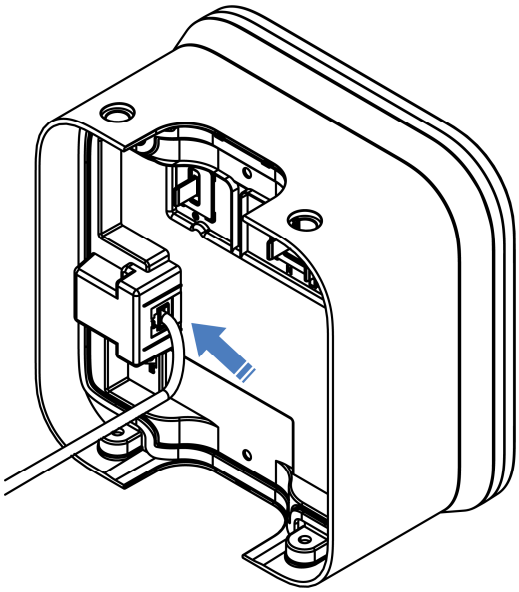
<table>
<tr>
<td>1. Keep the power turned off during wiring.
2. Insert one end of the Ethernet cable with RJ45 plug into the RJ45 port on the charger.
• Put the Ethernet cable with RJ45 plug (A) through the nut (B) and the waterproof cap (D). (Leave some space between them.)
• Connect the sealing ring (C) via its opening to the Ethernet cable and insert it into the waterproof cap.
• Screw the nut into the waterproof cap and make sure they are securely fastened.</td>
<td> 
</td>
</tr>
<tr>
<td>• Insert the RJ45 plug of the Ethernet cable into the RJ45 port (E) on the bottom of the charger.
3. Insert the other end of the Ethernet cable with RJ45 plug into the RJ45 port on the router.</td>
<td> 
</td>
</tr>
</table>

2. Secondary chargers can connect to the LAN/WLAN via either Ethernet cables or Wi-Fi, and the instructions are the same as that of the primary charger.

3.2.2 For AC Compact

Follow the steps below to connect the charger to the router using an Ethernet cable.

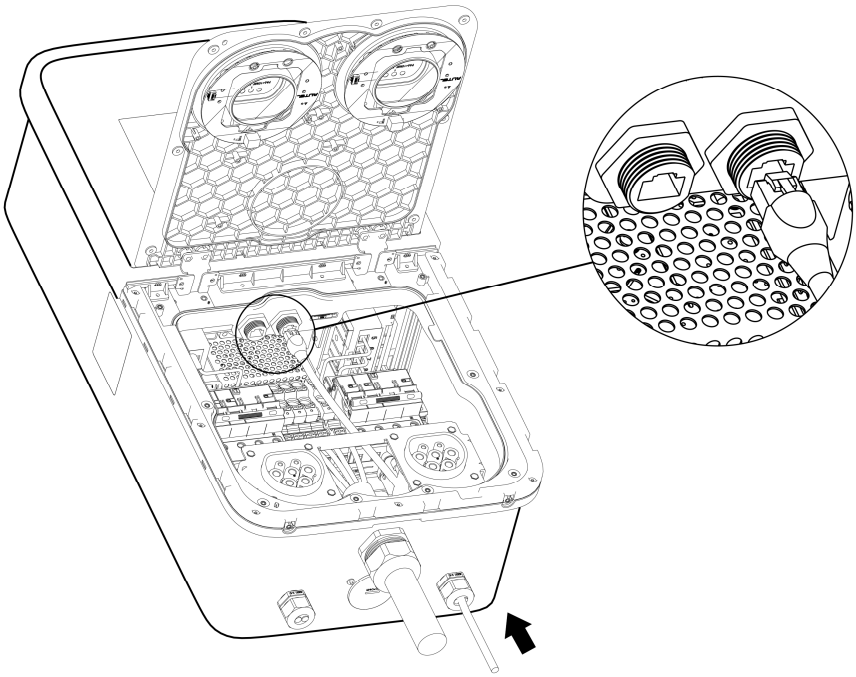
1. Keep the power turned off during wiring.
2. Connect the Ethernet cable to the port inside the main unit.
3. Connect the other end of the Ethernet cable to the router.



3.2.3 For AC Ultra

Follow the steps below to connect the charger to the router using an Ethernet cable.

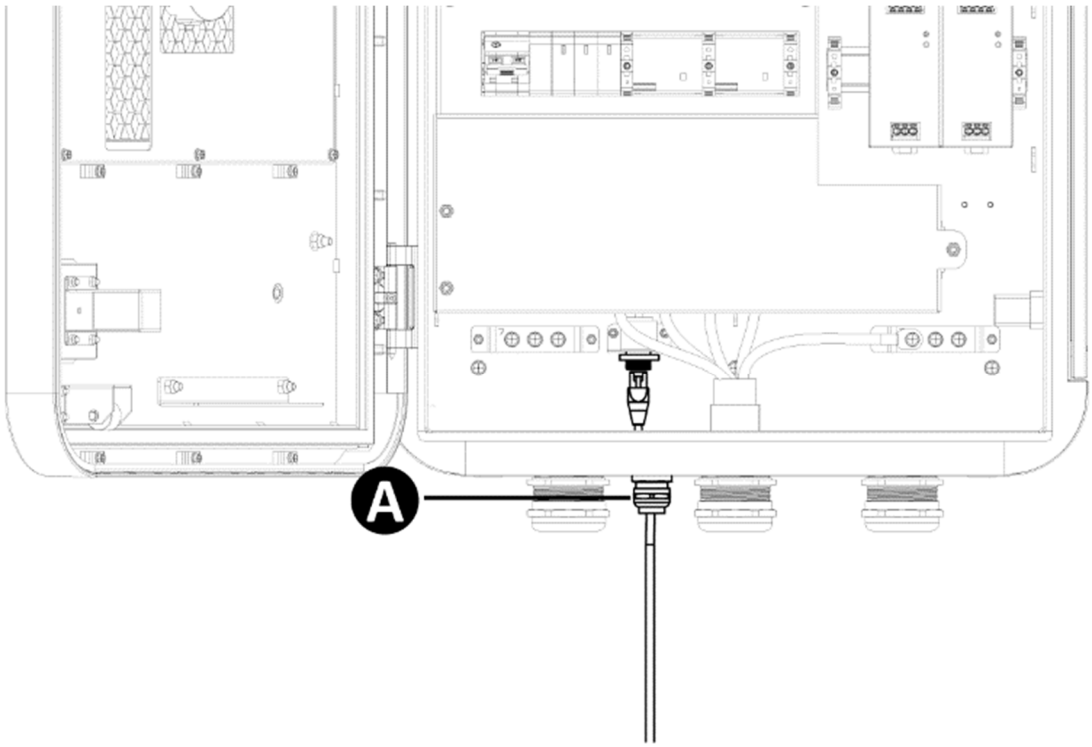
1. Keep the power turned off during wiring.
2. Insert the Ethernet cable with the RJ45 plug through either of the bottom data cable entry.
3. Plug the Ethernet cable into either of the RJ45 port as shown.
4. Connect the other end of the Ethernet cable to the router.



3.2.4 For DC Compact

Follow the steps below to connect the charger to the router using an Ethernet cable.

1. Keep the power turned off during wiring.
2. Loosen the cable gland (**A**).
3. Put the Ethernet cable through the Ethernet cable port at the bottom of the charger.
4. Plug the Ethernet cable into the RJ45 port.
5. Tighten the cable gland (**A**).
6. Connect the other end of the Ethernet cable to the router.



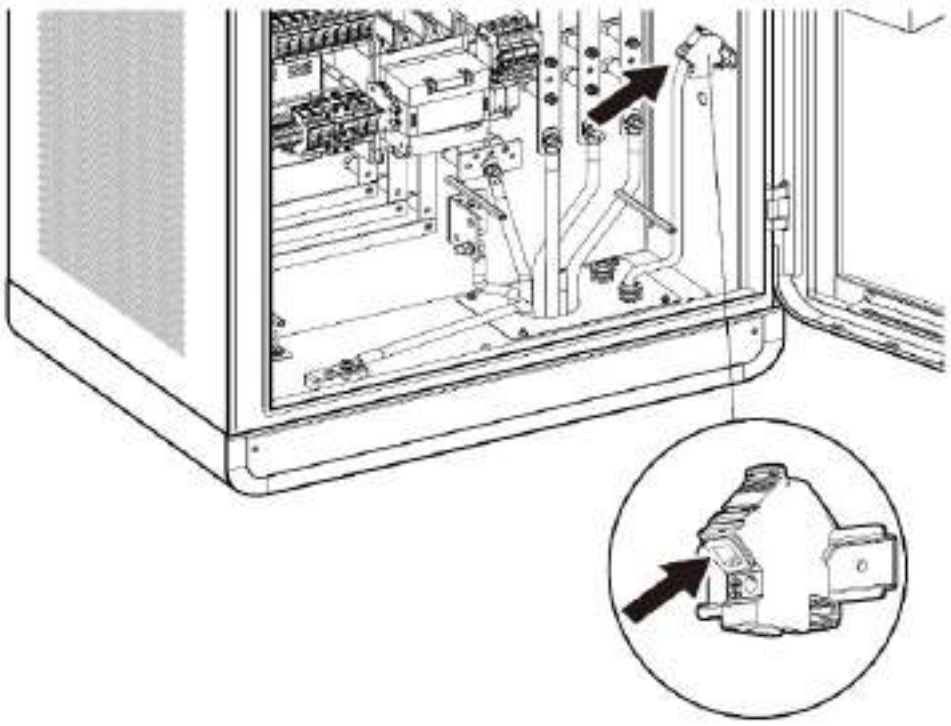
NOTE

For trolley-mounted MaxiCharger, Wi-Fi is preferred to access the Internet for movability.

3.2.5 For DC Fast

Follow the steps below to connect the charger to the router using an Ethernet cable.

1. Keep the power turned off during wiring.
2. Connect one end of the Ethernet cable to the RJ45 port and the other end to the router.



3.3 Wi-Fi Connection

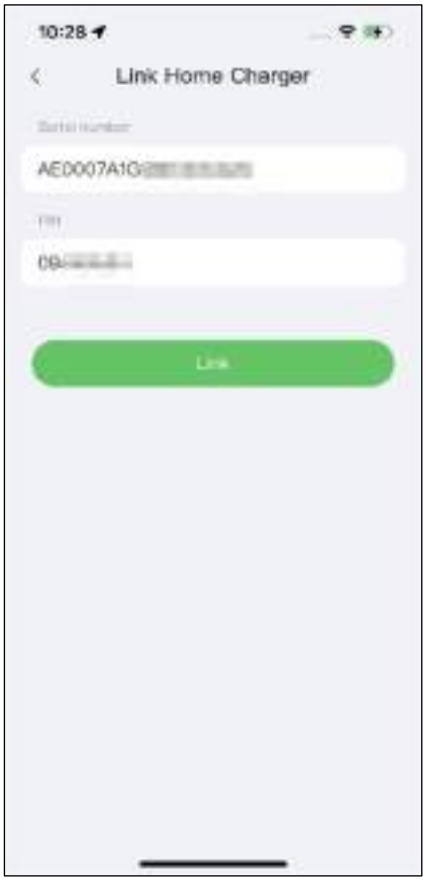
3.3.1 For AC Wallbox/AC Compact

1. **Download** the Autel Charge app.

NOTE
Make sure all Autel AC MaxiChargers and the Autel Charge app are running the latest software versions.

2. **Log in** to your Autel Charge app using your account and password, or register if you don't yet have an Autel Charge account.

3. **Add a charger**. After successfully logging in, tap **Add** to continue. Scan the QR code on the Quick Reference Guide to acquire the serial number and PIN of the charger, or tap **Enter Terminal Number** to manually enter the serial number and PIN. Tap **Link** after confirmation.



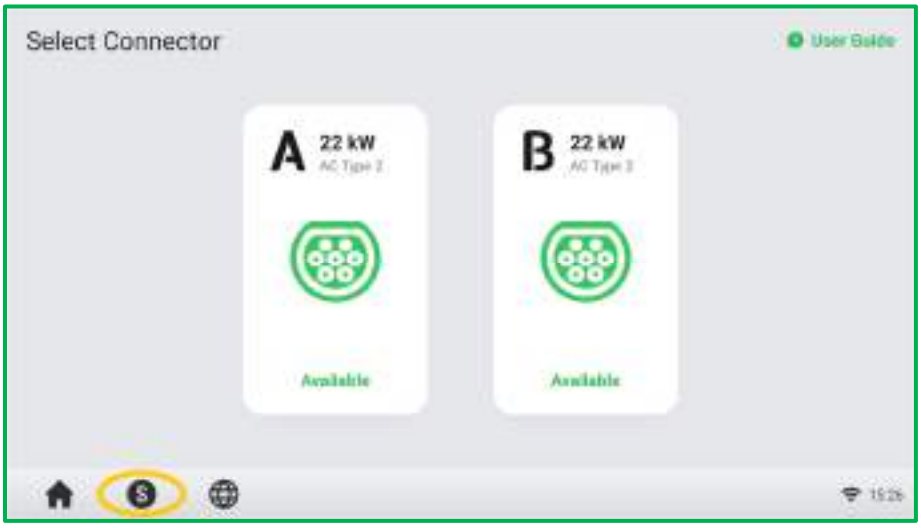
4. **Establish a communication between the charger and the Autel Charge app**. After adding the charger, tap **Connect via Bluetooth** to establish a communication, then configure Wi-Fi for the charger. Tap **Completed** on the Charge Settings screen to finish Wi-Fi connection.

NOTE

1. Bluetooth can only be connected to one charger at a time. Switching the operation to another charger will disconnect the Bluetooth connection with the existing charger and connect it to a new charger.
2. All chargers added must be on the same Wi-Fi network.

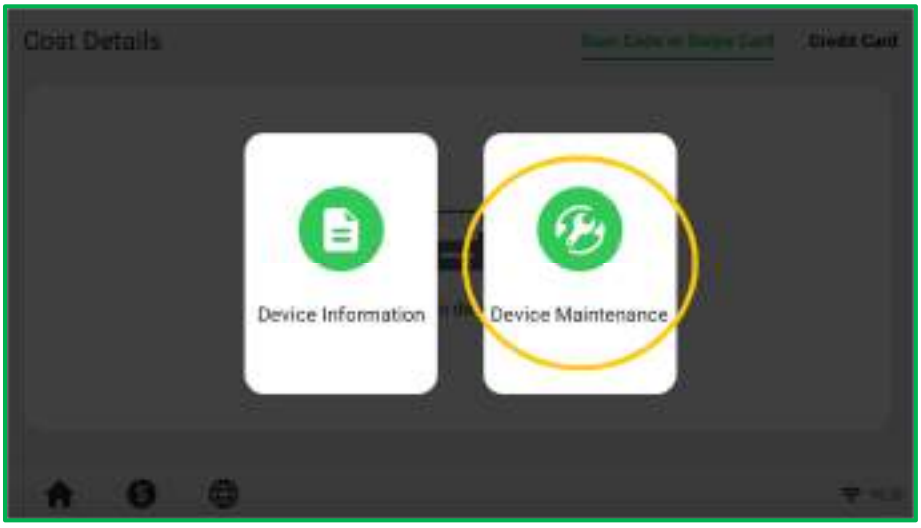
3.3.2 For AC Ultra/DC Compact/DC Fast

1. On the Standby screen, tap the “currency (**$**)” icon on the lower-left corner to enter the Cost Details screen.

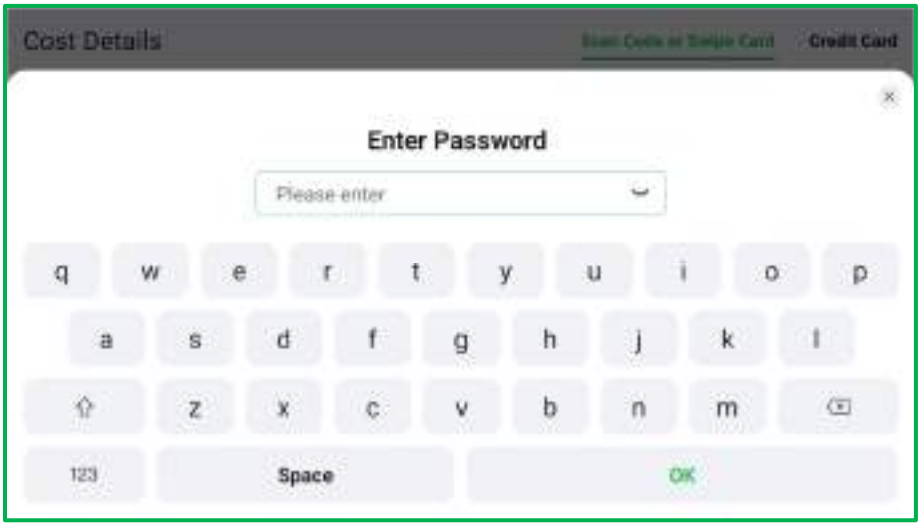


2. On the Cost Details screen, **double tap** the upper-left corner to proceed.

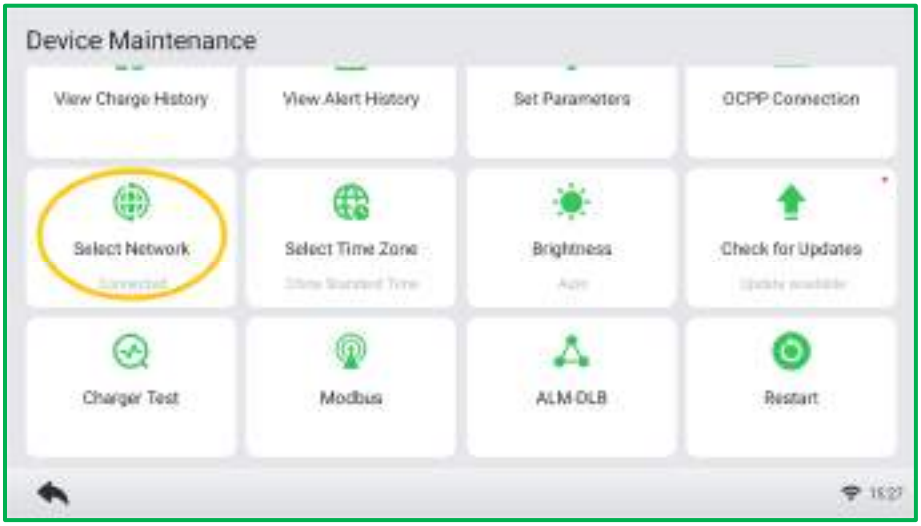
3. Select **Device Maintenance** on the screen.



4. A password prompt will appear. Enter **the last 6 characters of the product serial number** to continue, which can be found on the product label. For example, if the product serial number is DE0090B1GNBC00029P, the password is 00029P (The letter “P” is capitalized). If that doesn’t work, try using 1234 as the password.



5. On the Device Maintenance screen, click on **Select Network**.



6. Enable Wi-Fi as shown below. Select the Wi-Fi needed and enter the password to establish a WLAN connection.

7. To avoid a change in IP address after powering off or restarting the charger:

1) Tap the icon “**i**” to the right of the selected Wi-Fi and choose **Set**.

2) Click “ **>** ”to the right of the IP Settings and select **Static**.

3) Configure the **Default Gateway** manually.

4) Click the **Save** button to save the setup.

3.4 Wiring RS485 Cable

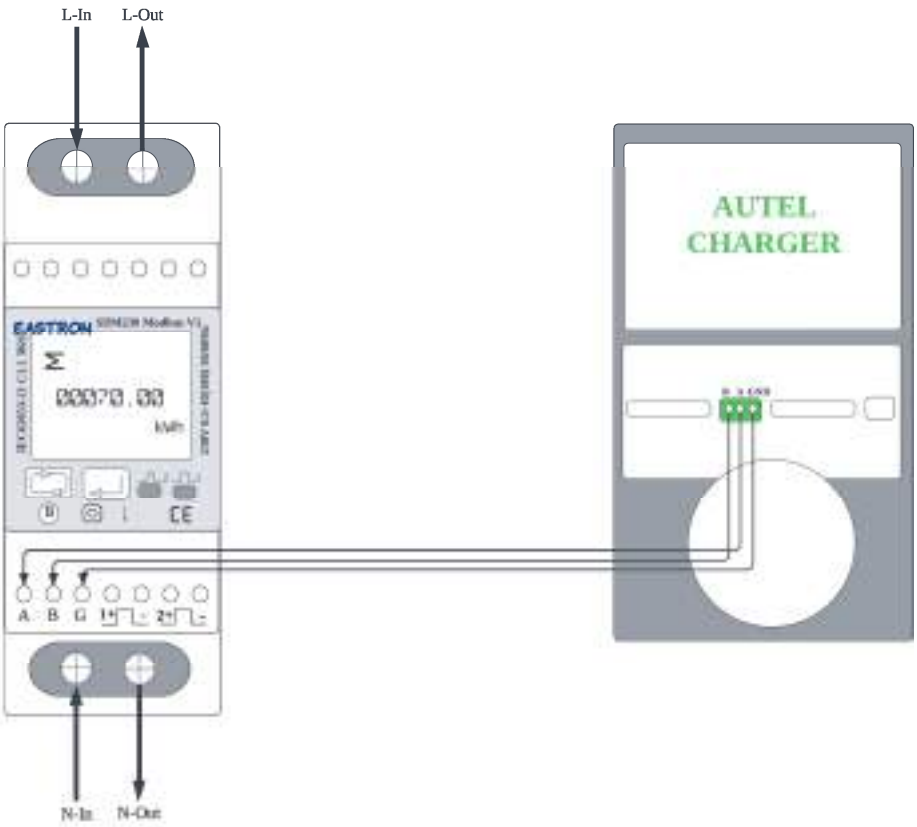
An RS485 cable is required for establishing a communication between the primary charger and the meter.

3.4.1 For AC Wallbox

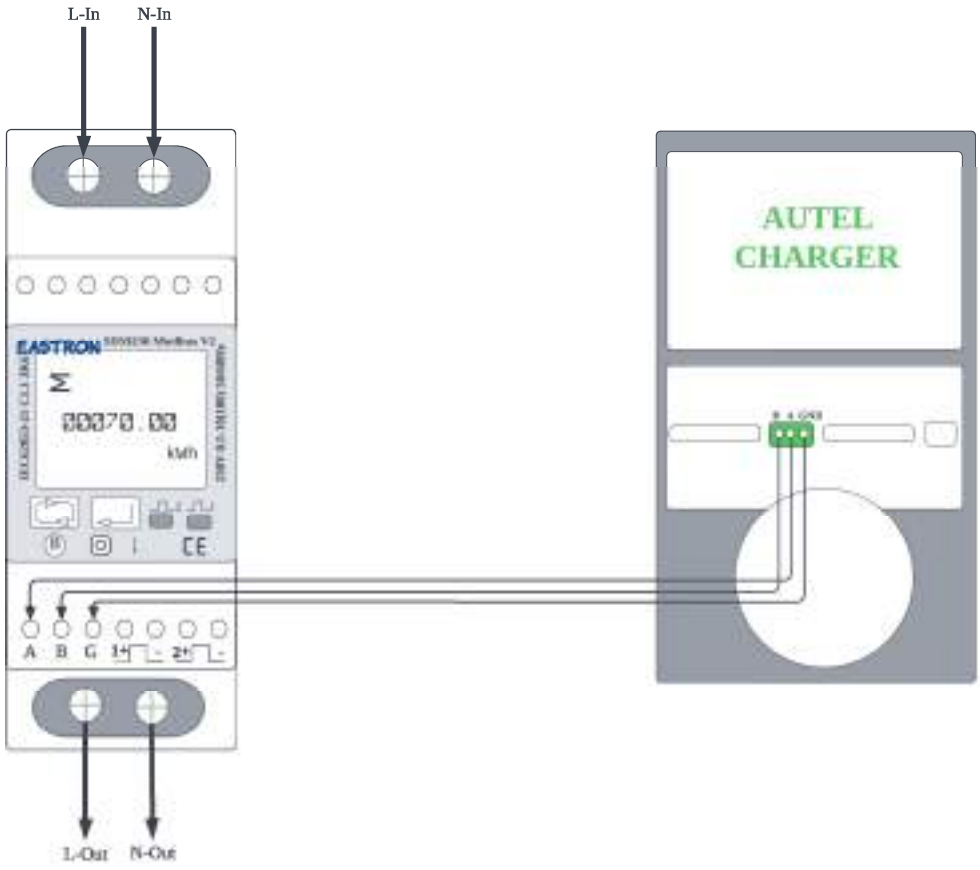
To save time in purchasing an appropriate energy meter, the recommended energy meters are listed below, which can be purchased from local distributors.

Phase	Current Range	Part	Meter Type (Recommended)	CT Type (Recommended)
Single-phase	≤ 100 A (for EU market)	Meter	SDM230-Modbus V1	/
	≤ 100 A (for UK market)	Meter	SDM230-Modbus V2	/
	≤ 100 A	Meter + CT	SDM120CTM	ESCT-TA16 100A/100mA
Three-phase	≤ 100 A	Meter	SDM630-Modbus V2	/
	> 100 A	Meter + CT	SDM630MCT V2	ESCT-T24 250A/5A

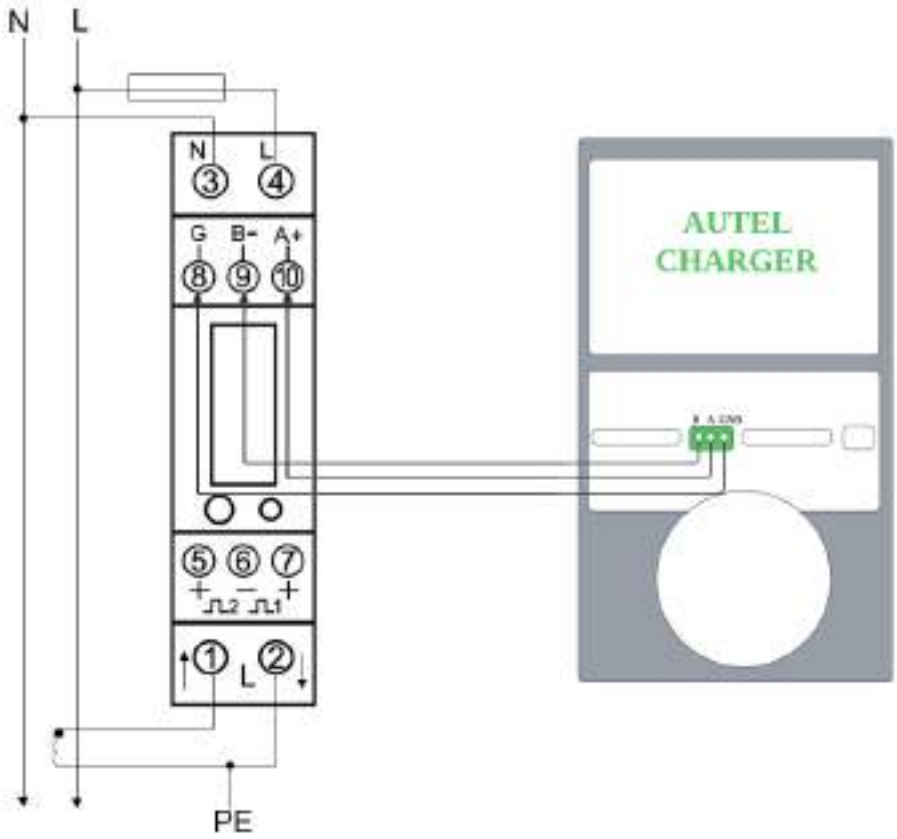
After the meter is properly installed and connected to upstream MCB/RCBO, wire an RS485 cable between the charger and meter.



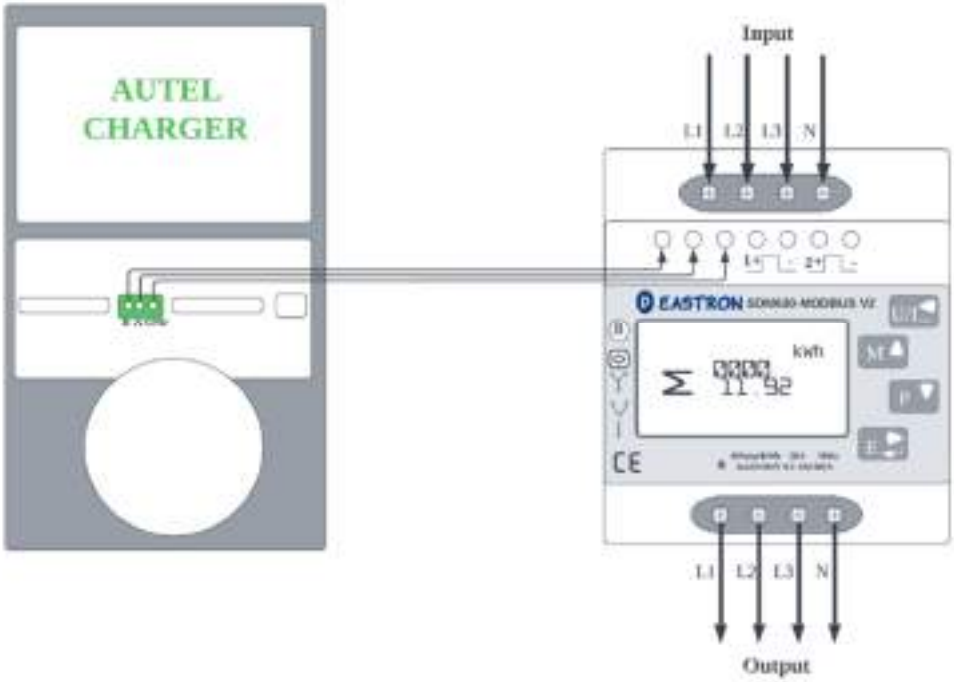
SDM230-Modbus V1 Energy Meter and Autel Charger Wiring Diagram



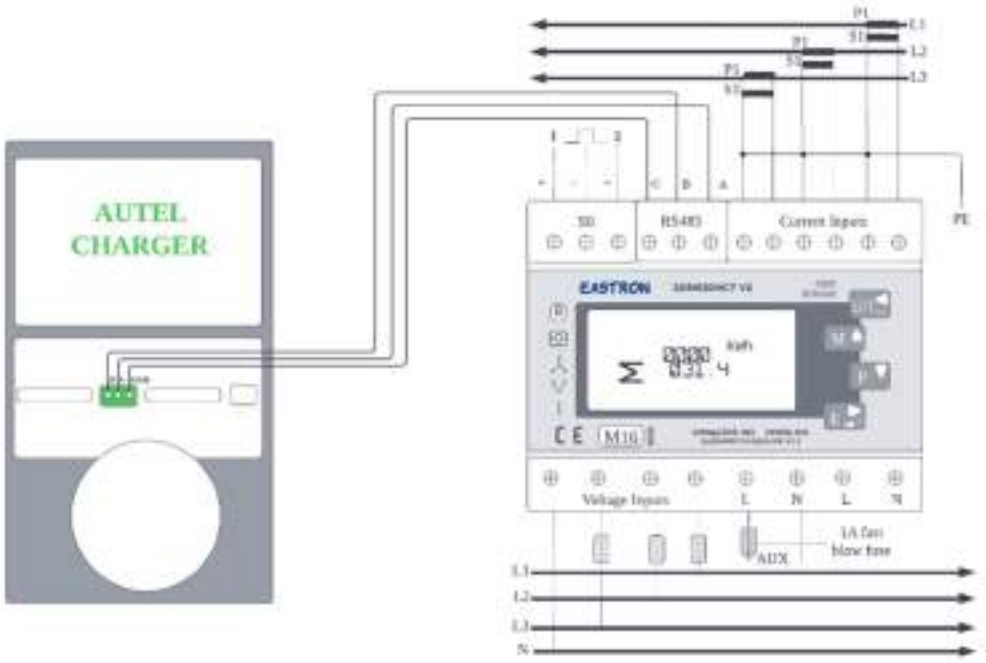
SDM230-Modbus V2 Energy Meter and Autel Charger Wiring Diagram



SDM120CTM Energy Meter and Autel Charger Wiring Diagram



SDM630-Modbus V2 Energy Meter and Autel Charger Wiring Diagram



SDM630MCT V2 Energy Meter and Autel Charger Wiring Diagram

NOTE

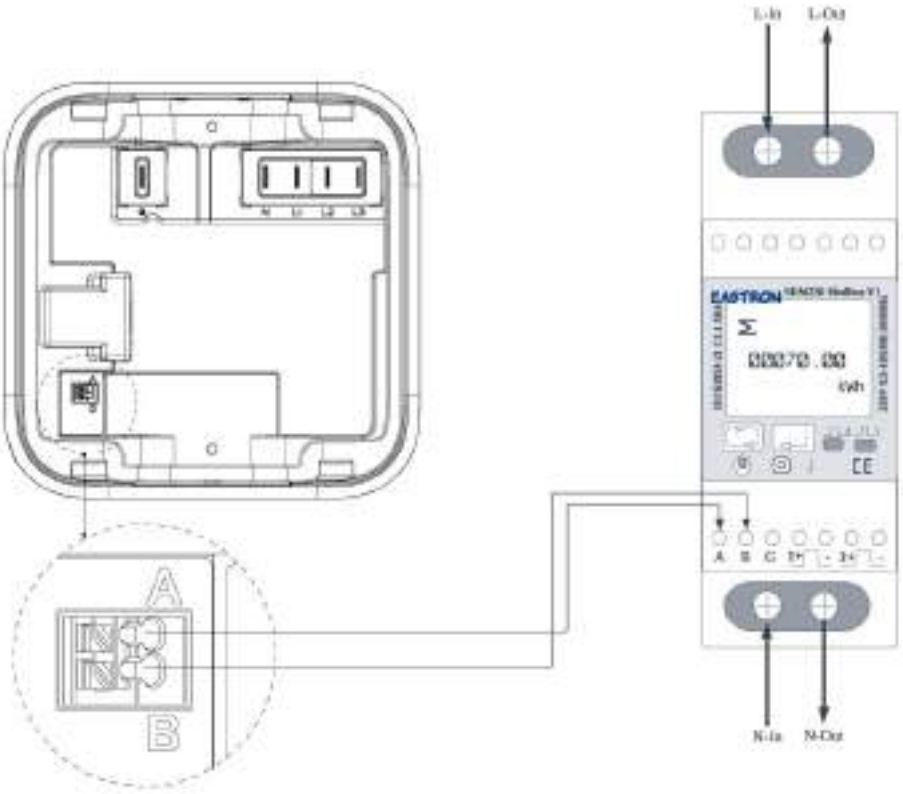
1. Always keep the power turned off during wiring.
2. Ground wiring is not necessary in many cases. Determine whether to ground according to the local regulations. The above diagrams are presented in the form of grounding.
3. The CT sensors should be grounded to local PE due to the need for surge current protection.
4. In order for the meter to measure data accurately, it needs to be configured correctly. Please refer to the meter's user manual for configuration instructions.

3.4.2 For AC Compact

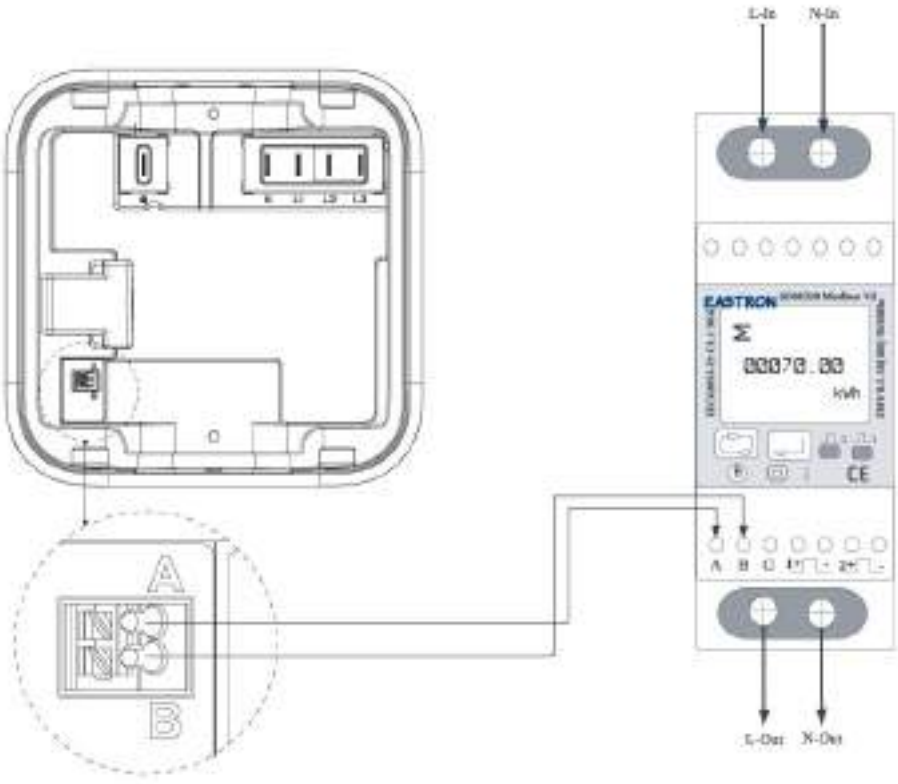
To save time in purchasing an appropriate energy meter, the recommended energy meters are listed below, which can be purchased from local distributors.

Phase	Current Range	Part	Meter Type (Recommended)	CT Type (Recommended)
Single-phase	≤ 100 A (for EU market)	Meter	SDM230-Modbus V1	/
	≤ 100 A (for UK market)	Meter	SDM230-Modbus V2	/
	≤ 100 A	Meter + CT	SDM120CTM	ESCT-TA16 100A/100mA
Three-phase	≤ 100 A	Meter	SDM630-Modbus V2	/
	> 100 A	Meter + CT	SDM630MCT V2	ESCT-T24 250A/5A

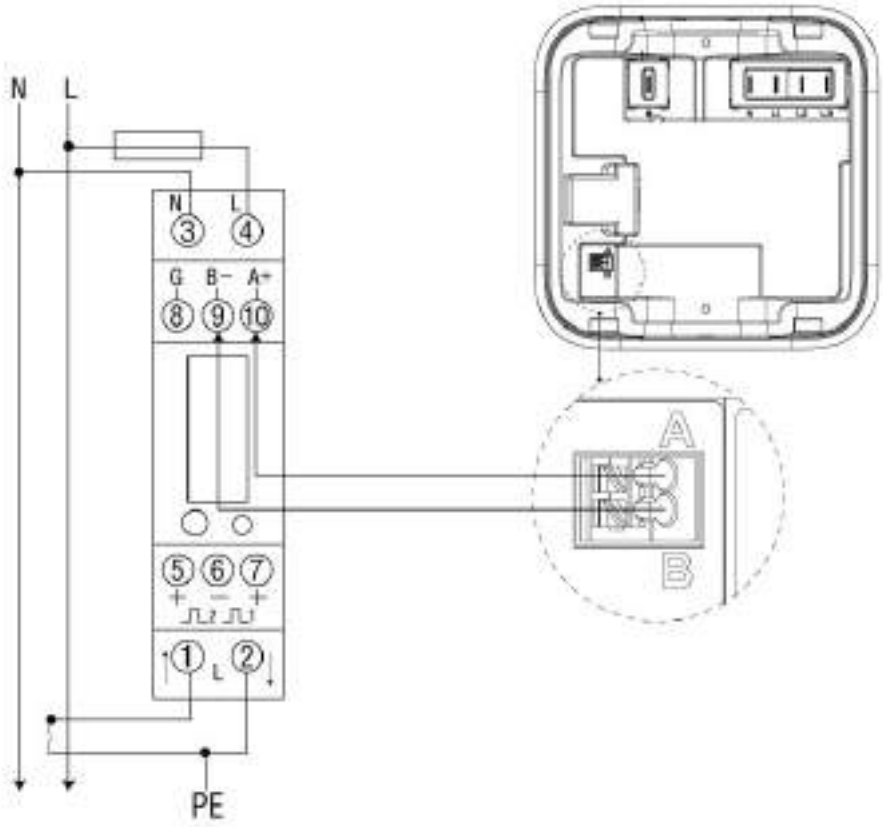
After the meter is properly installed and connected to upstream MCB/RCBO, wire an RS485 cable between the charger and meter.



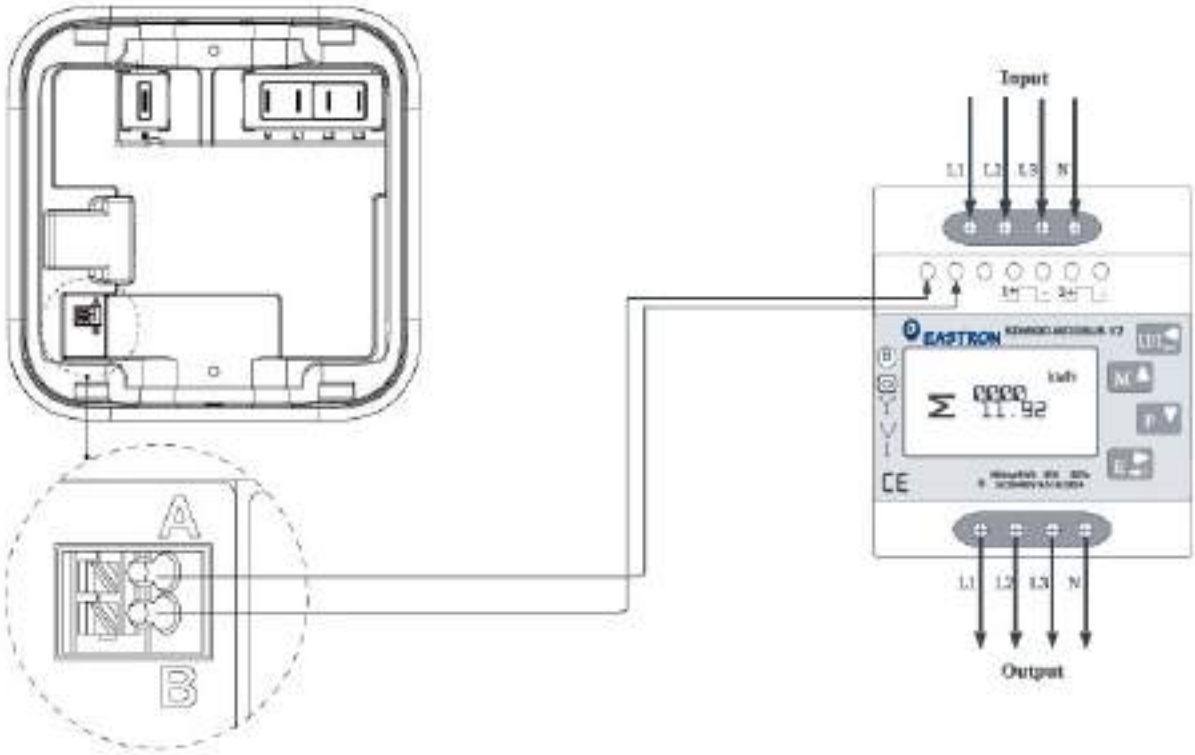
SDM230-Modbus V1 Energy Meter and Autel Charger Wiring Diagram



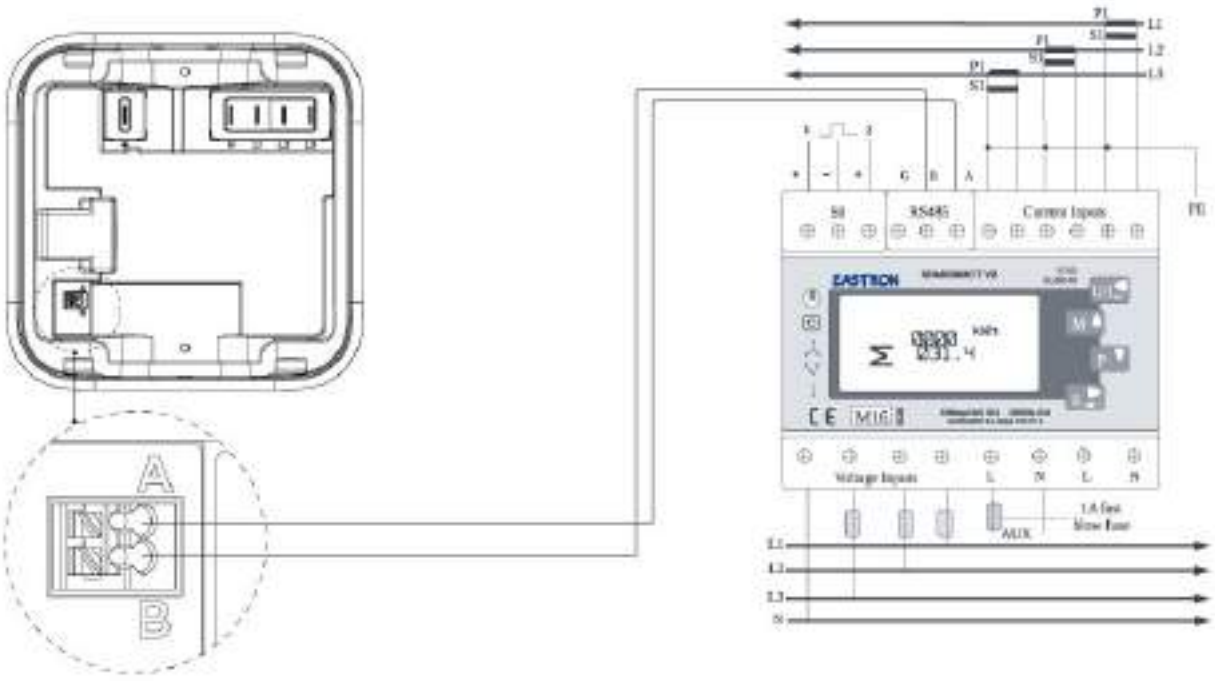
SDM230-Modbus V2 Energy Meter and Autel Charger Wiring Diagram



SDM120CTM Energy Meter and Autel Charger Wiring Diagram



SDM630-Modbus V2 Energy Meter and Autel Charger Wiring Diagram



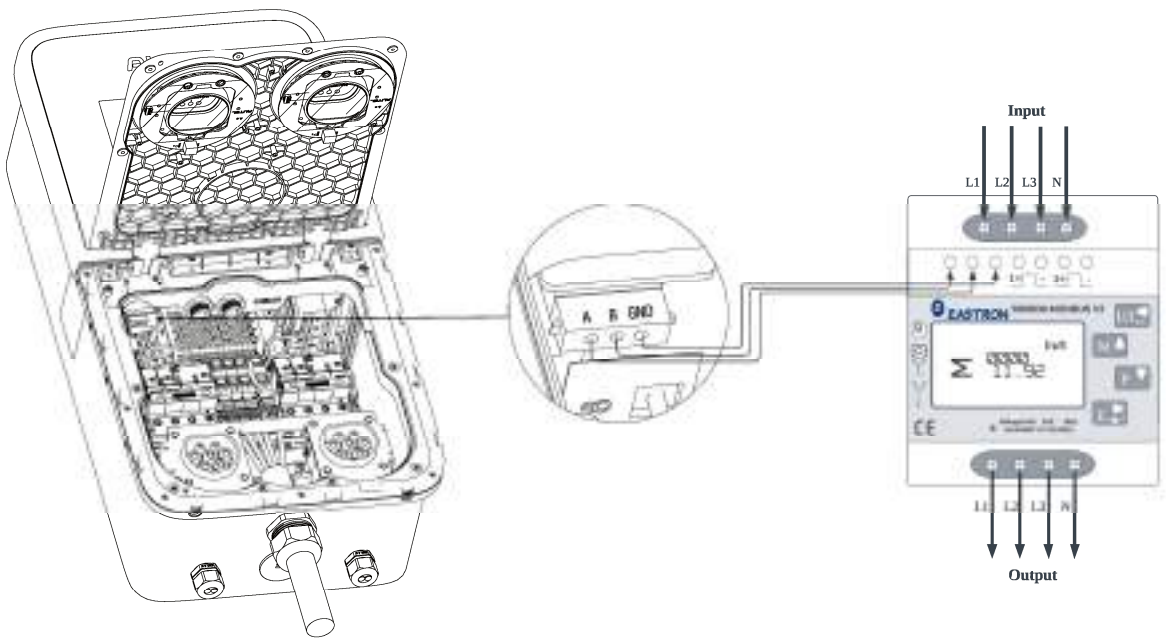
SDM630MCT V2 Energy Meter and Autel Charger Wiring Diagram

3.4.3 For AC Ultra

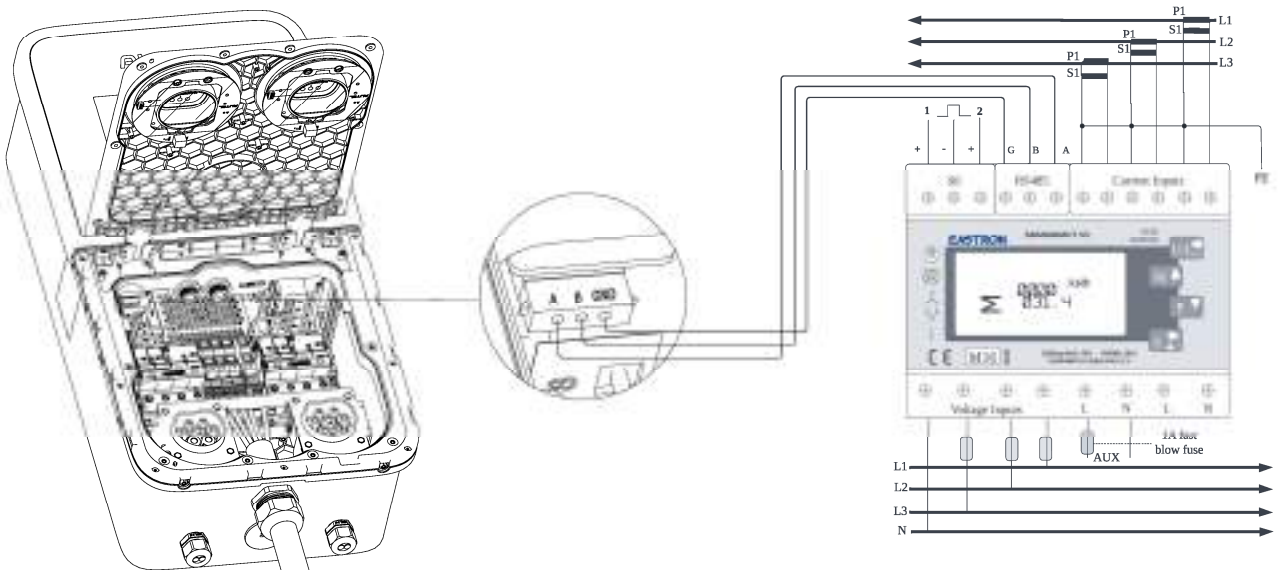
To save time in purchasing an appropriate energy meter, the recommended energy meters are listed below, which can be purchased from local distributors.

Phase	Current Range	Part	Meter Type (Recommended)	CT Type (Recommended)
Three-phase	≤ 100 A	Meter	SDM630-Modbus V2	/
	> 100 A	Meter + CT	SDM630MCT V2	ESCT-T24 250A/5A

After the meter is properly installed and connected to upstream MCB/RCBO, wire an RS485 cable between the charger and meter.



SDM630-Modbus V2 Energy Meter and Autel Charger Wiring Diagram



SDM630MCT V2 Energy Meter and Autel Charger Wiring Diagram

To establish a communication between the primary charger and the meter, the following settings of the meter should be completed:

- **Modbus Address**: 001
- **Baud Rate**: 9600
- **Parity Bit**: EVEN
- **Stop Bit**: 1

Entering Set-up Menu

Power up the meter. All the display segments will light up on the screen of the meter. The Set-up Menu is password-protected, so password verification is required before proceeding. The default password is 1000.

➢ **To enter the correct password**

1. Long press the E button for 3 seconds to enter the Password screen — the first digit will be flashing.

2. Short press the M button or the P button to set the digit to the required number. And next, short press the E button to move right. The next digit will be flashing. Repeat the procedures to set the remaining digits.
3. When the password displays 1000, long press the E button to confirm your setting.

4. If the password is correct, users will be authorized to access the Set-up Menu; if the password is incorrect, the screen indicating your entered password is incorrect will appear. And the meter will return to the Password screen in 2 seconds.

5. Short press the U/I button to return to the Set-up Menu.

➢ **To set the Modbus Address:**

1. Short press the M button or the P button to select the **Address ID** option.

2. Long press the E button to enter the setting routine — the first digit will be flashing.

3. Short press the M button or the P button to set the digit to the required number. And next, short press the E button to move right. The next digit will be flashing. Repeat the procedures to set the remaining digits.
4. When the Modbus address displays 001, long press the E button to confirm your setting.

NOTE
If the default Modbus address has been set as 001, skip the steps above and long press the E button to confirm.

5. Once the Modbus address is set properly, short press the U/I button to return to the Set-up Menu.

➢ **To set the Baud Rate**

1. Short press the M button or the P button to select the **Baud Rate** option.

2. Long press the E button to enter the setting routine — the current setting will be flashing.

3. Short press the M button or the P button to choose 9.6k from the existing values. And next, long press the E button to confirm your selection when 9.6k is displayed on the screen.

NOTE
If the default baud rate has been set as 9.6k, skip the steps above and long press the E button to confirm.

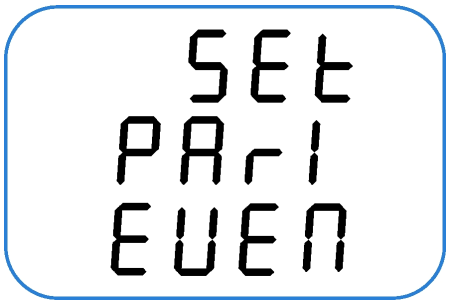
4. Once the baud rate is set to 9.6k, short press the U/I button to return to the Set-up Menu.

➢ **To Set the Parity Bit**

1. Short press the M button or the P button to select the **Parity** option.

2. Long press the E button to enter the setting routine — the current setting will be flashing.

3. Short press the M button or the P button to select **EVEN** from the existing options.



4. Long press the E button to confirm your selection when **EVEN** is displayed on the screen.

NOTE
If the default parity bit has been set as EVEN, skip the steps above and long press the E button to confirm.

5. Once the parity bit is set properly, short press the U/I button to return to the Set-up Menu.

➢ **To set Stop Bit**

1. Short press the M button or the P button to select the **Stop Bit** option.

2. Long press the E button to enter the setting page — the current setting will be flashing.

3. Short press the M button or the P button to select 1 from the existing options. And next, long press the E button to confirm your selection when 1 is displayed on the screen.

NOTE
If the default stop bit has been set as 1, skip the steps above and long press the E button to confirm.

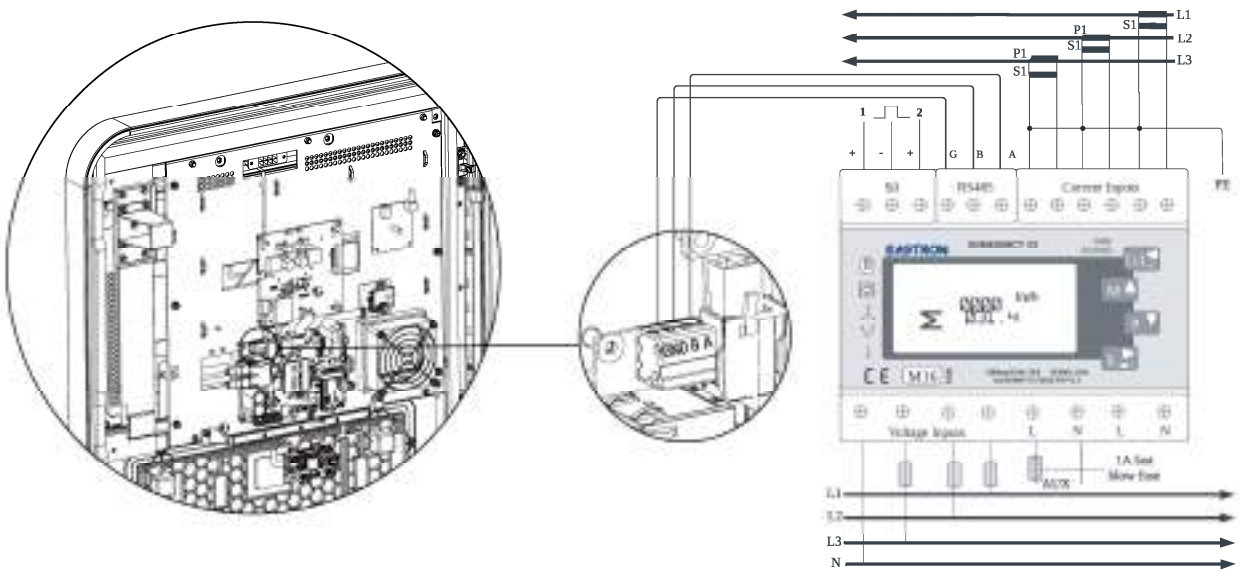
4. Once the stop bit is set properly, short press the U/I button to return to the Set-up Menu.

3.4.4 For DC Compact

To save time in purchasing an appropriate energy meter, the recommended energy meter is listed below, which can be purchased from local distributors.

Phase	Current Range	Part	Meter Type (Recommended)	CT Type (Recommended)
Three-phase	> 100 A	Meter + CT	SDM630MCT V2	ESCT-T24 250A/5A

After the meter is properly installed and connected to upstream MCB/RCBO, wire an RS485 cable between the charger and meter.



SDM630MCT V2 Energy Meter and Autel Charger Wiring Diagram

To establish a communication between the primary charger and the meter, the following settings of the meter should be completed:

- **Modbus Address**: 003
- **Baud Rate**: 9600
- **Parity Bit**: EVEN
- **Stop Bit**: 1

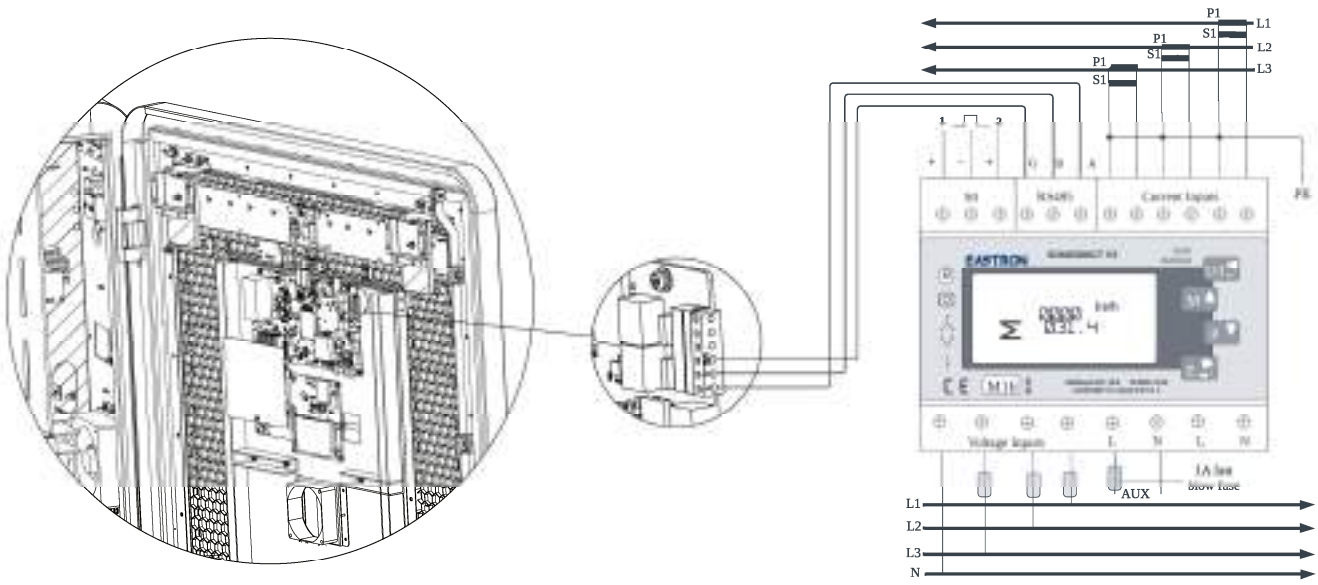
Refer to *3.4.3* to operate.

3.4.5 For DC Fast

To save time in purchasing an appropriate energy meter, the recommended energy meter is listed below, which can be purchased from local distributors.

Phase	Current Range	Part	Meter Type (Recommended)	CT Type (Recommended)
Three-phase	> 100 A	Meter + CT	SDM630MCT V2	ESCT-T24 250A/5A

After the meter is properly installed and connected to upstream MCB/RCBO, wire an RS485 cable between the charger and meter.



SDM630MCT V2 Energy Meter and Autel Charger Wiring Diagram

To establish a communication between the primary charger and the meter, the following settings of the meter should be completed:

- **Modbus Address**: 003
- **Baud Rate**: 9600
- **Parity Bit**: EVEN
- **Stop Bit**: 1

Refer to *3.4.3* to operate.

4 Configuration

Follow the steps below to activate the operating modes on the charger or via the Autel Charge app once you have installed and wired all the units according to the system diagram.

4.1 For Scenario with AC Wallbox/AC Compact

4.1.1 Set up DLB Mode

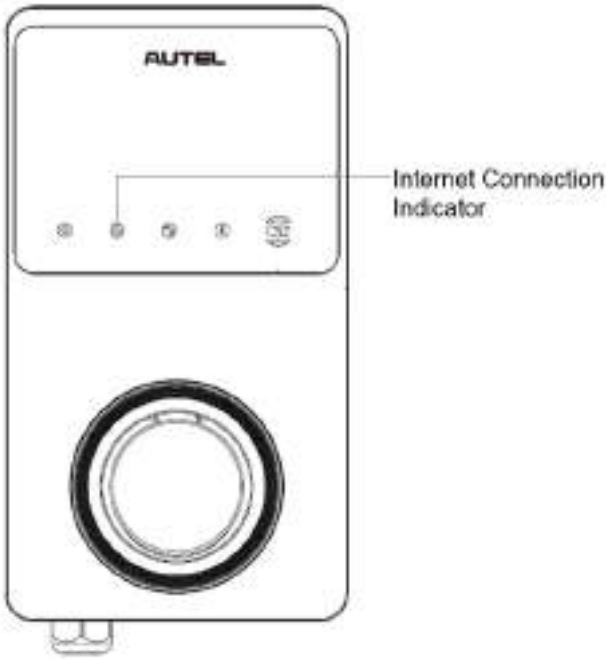
1. **Refer to *3.3.1* to operate.**
2. **Add secondary chargers**. Tap **Add** on the upper-right corner on the following screen and follow **STEP 3–4** in *3.3.1* to add more chargers and configure their Wi-Fi.

NOTE

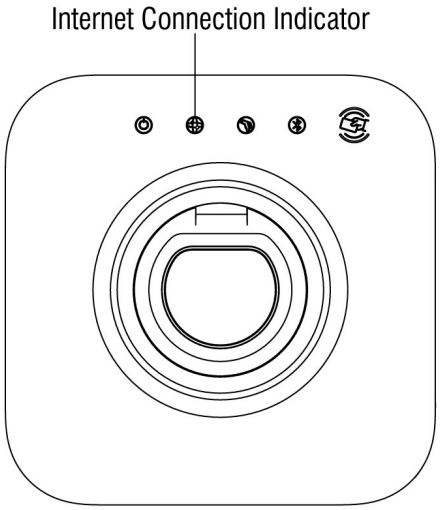
1. Bluetooth can only be connected to one charger at a time. Switching the operation to another charger will disconnect the Bluetooth connection with the existing charger and connect it to a new charger.
2. All chargers added must be on the same Wi-Fi network.

After adding chargers and configuring them to the same Wi-Fi network, you can check if the chargers are configured for local DLB by viewing the Internet Connection Indicator.

- Internet Connection Indicator of AC Wallbox



- Internet Connection Indictor of AC Compact



Internet Connection Indicator (AC Wallbox/AC Compact)

Indicator	Status	Description
Internet Connection Indicator	Steady On	Internet connected; Local DLB not enabled or EMS available.
	Steady Off	Internet not connected.
	Blink Fast	Internet not connected; Local DLB enabled.
	Blink Slow	Internet connected; Local DLB available.

3. **Set primary charger**. Tap **Account** > **Charger**. Select the charger connected to Bluetooth from the chargers list, then tap **Load Balancing** > **Power Sharing**. A brief description about this mode will display on the screen. Tap **Set as Primary** to designate the charger as the primary charger.

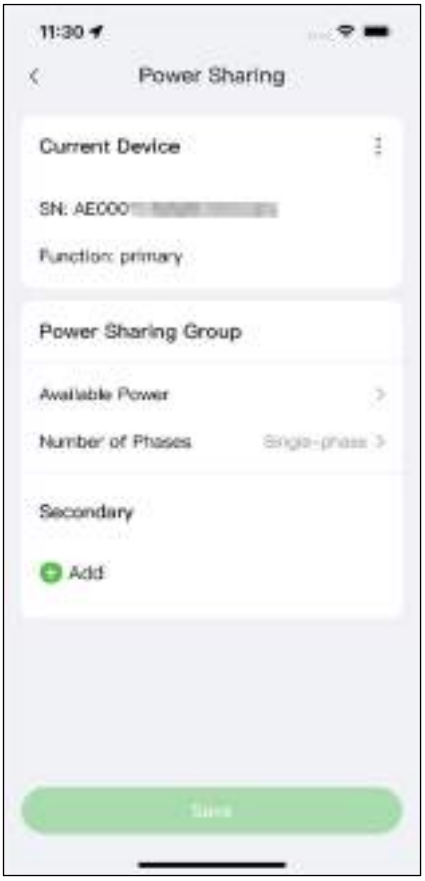
4. **Set up DLB mode.** After designating the primary charger, you must configure it for DLB mode.

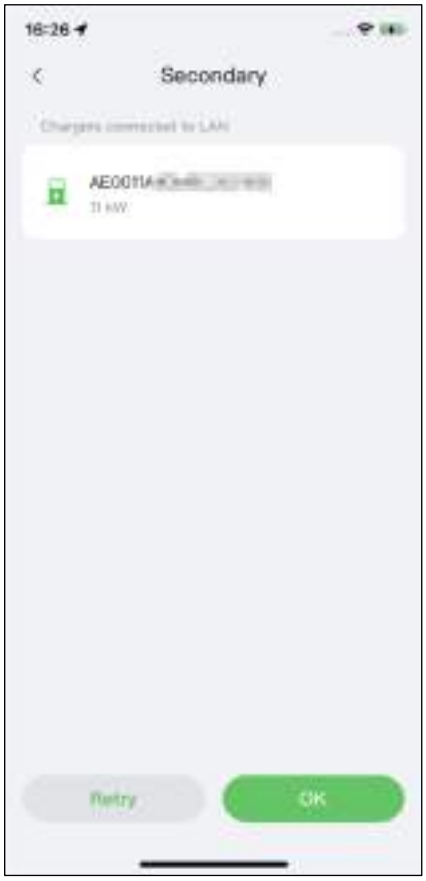
- ✓ **Available Power (kW)**: you must enter the available power that the system can supply to the chargers. This value must be expressed as a whole number.

  The value of the available power should be within the following range:

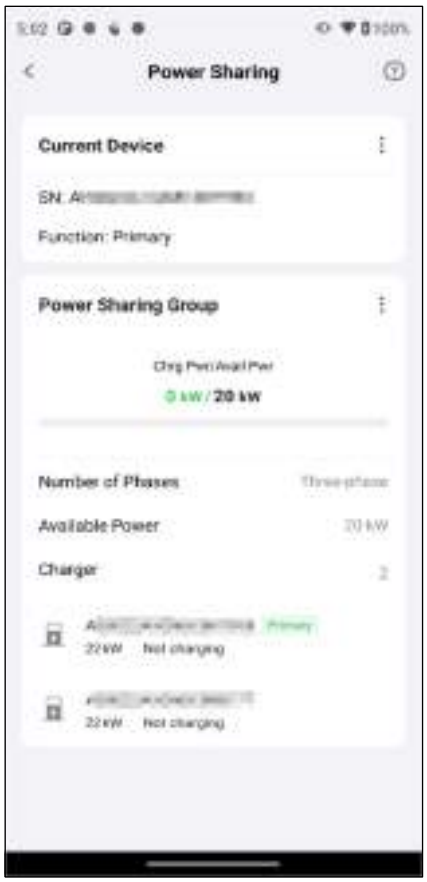
  - ◆ Maximum Value: lower than the upstream MCB/RCBO rated power.
  - ◆ Minimum Value: higher than the minimum power of one charger (1.4 kW for single-phase, 4.2 kW for three-phase) x N (N represents the number of chargers in the device group).

- ✓ **Number of Phases:** select **Single-phase** or **Three-phase** based on your power supply mode.
- ✓ **Add secondary chargers**: tap **Add** to display other chargers connected to the same network. Tap **OK** once you have confirmed.



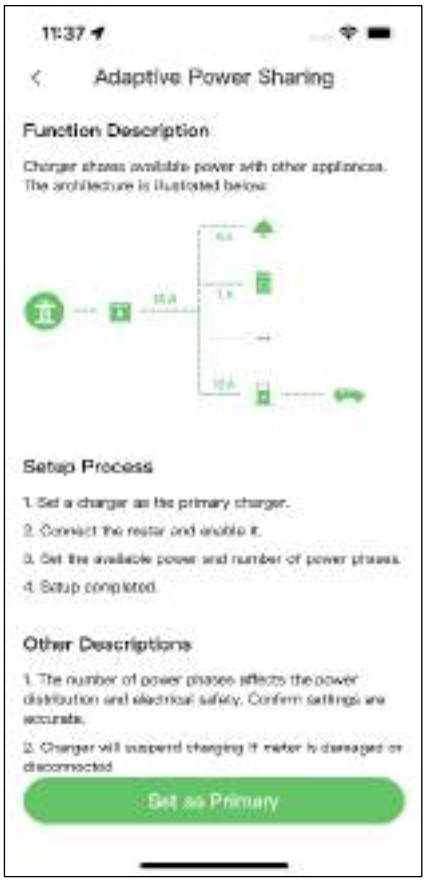


5. **Confirm configuration**. After all the settings above are completed, tap **Save** on the Power Sharing screen. The real-time charging details will display on the screen. Tap the "**<**" icon on the upper-left corner of the charging details screen to return to the mode selection screen. The **Enabled** tag will appear on this mode, indicating that DLB mode is activated and your chargers can be charged according to your settings.



4.1.2 Set up ALM Mode w/Single Charger

1. **Refer to *3.3.1* to operate.**
2. **Set primary charger**. Tap **Account** > **Charger**. Select the charger connected to Bluetooth from the chargers list, then tap **Load Balancing** > **Adaptive Power Sharing (Single)**. A brief description about this mode will display on the screen. Tap **Set as Primary** to designate the charger as the primary charger.



3. **Set up ALM mode w/single charger.** After setting the primary charger, you need to complete the settings to set up ALM mode w/single charger.

- ✓ **Smart Meter**: toggle the **Smart Meter** ON.
- ✓ **Available Power (kW)**: you need to enter the available power that the system can supply to the chargers. You must enter a whole number.

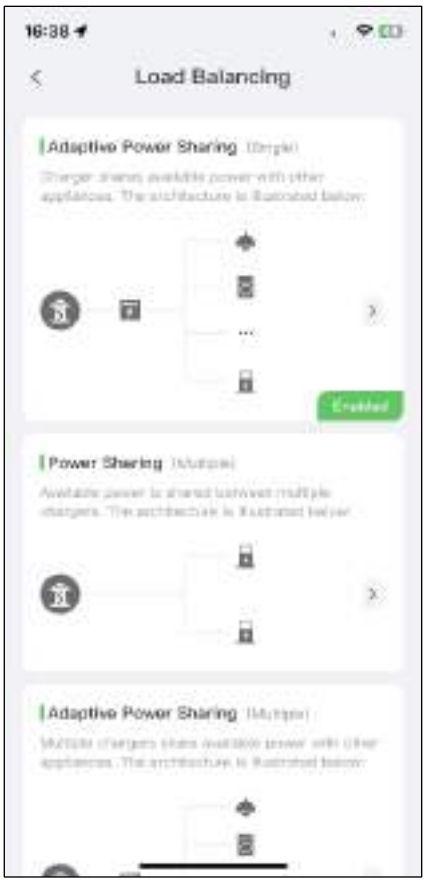
  The value of the available power should be within the following range:

  - ◆ Maximum Value: lower than the upstream MCB/RCBO rated power.
  - ◆ Minimum Value: higher than the minimum power of one charger (1.4 kW for single-phase, 4.2 kW for three-phase) x N (N represents the number of chargers in the device group).

- ✓ **Power Reserve**: you must enter the power reserve for the charger, namely the reserved power not used for charging.
  - ◆ The range of the power reserve is from 0–50%. The maximum reserved power that can be entered is 50% of the total home power.
  - ◆ The default setting of the power reserve is 10%, which is used for the dynamic power change caused by load switching in and out.

- ✓ **Number of Phases**: select **Single-phase** or **Three-phase** based on your power supply mode.

4. **Confirm configuration**. After all the settings above are completed, tap **Save** on the Adaptive Power Sharing screen. The real-time charging details will display on the screen. Tap the "**<**" icon on the upper-left corner of the charging details screen to return to the mode selection screen. The **Enabled** tag will appear on this mode, indicating that the ALM mode w/single charger is activated and your charger can now be charged according to your settings.



4.1.3 Set up ALM Mode w/Multiple Chargers

1. **Refer to *3.3.1* to operate.**
2. **Add secondary chargers**. Tap **Add** on the upper-right corner on the following screen and follow **STEP 3–4** in *3.3.1* to add more chargers and configure their Wi-Fi.

3. **Set primary charger**. Tap **Account** > **Charger**. Select the charger connected to Bluetooth from the chargers list, then tap **Load Balancing** > **Adaptive Power Sharing (Multiple)**. A brief description about this mode will display on the screen. Tap **Set as Primary** to set the charger as primary charger.

4. **Set up ALM mode w/multiple chargers**. After designating the primary charger, you need to complete the settings to set up ALM mode w/multiple chargers.

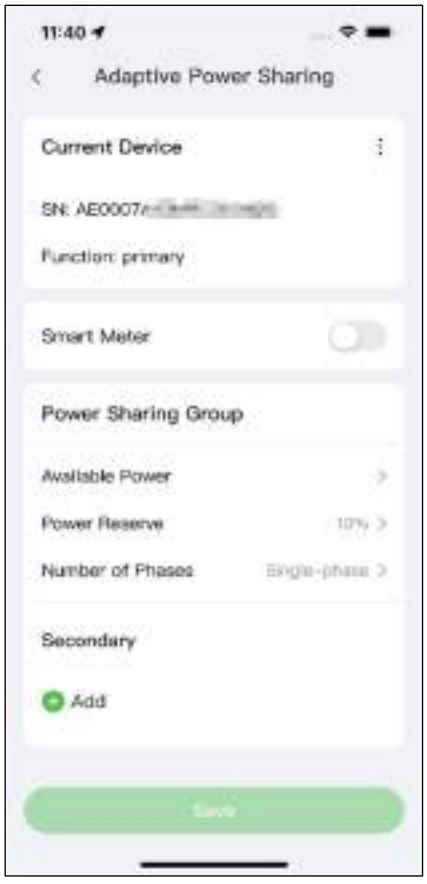
- ✓ **Smart Meter**: toggle the **Smart Meter** ON.
- ✓ **Available Power (kW)**: you need to enter the available power the system can supply to the chargers. You must enter a whole number.

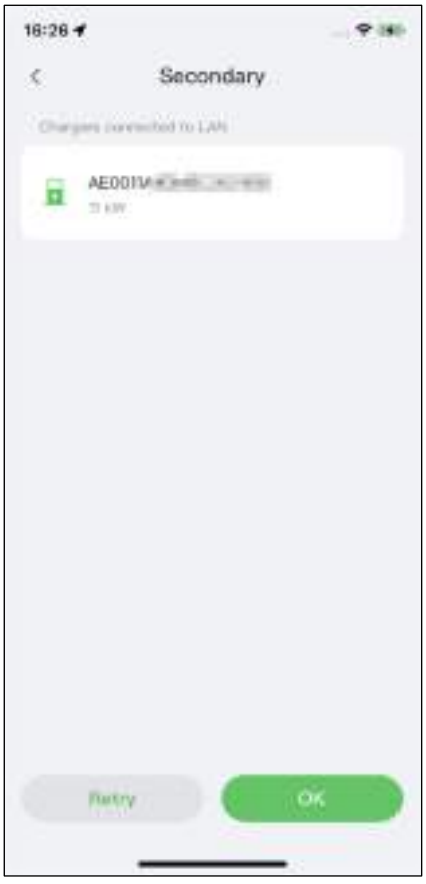
  The value of the available power should be within the following range:

  - ◆ Maximum Value: lower than the upstream MCB/RCBO rated power.
  - ◆ Minimum Value: higher than the minimum power of one charger (1.4 kW for single-phase, 4.2 kW for three-phase) x N (N represents the number of chargers in the device group).

- ✓ **Power Reserve**: you must enter the power reserve for the chargers, namely the reserved power not used for charging.
  - ◆ The range of the power reserve is from 0–50%. The maximum reserved power that can be entered is 50% of the total home power.
  - ◆ The default setting of the power reserve is 10%, which is used for the dynamic power change caused by load switching in and out.

- ✓ **Number of Phases**: select **Single-phase** or **Three-phase** based on your power supply mode.
- ✓ **Add Secondary Chargers**: tap **Add** to display other chargers connected to the same network. Tap **OK** once you have confirmed.





5. **Confirm configuration**. After all the settings above are completed, tap **Save** on the Adaptive Power Sharing screen. The real-time charging details will display on the screen. Tap the "**<**" icon on the upper-left corner of the charging details screen to return to the mode selection screen. The **Enabled** tag will appear on this mode, indicating that ALM mode w/multiple chargers is activated and your chargers can now be charged according to your settings.

4.1.4 Set up PV Mode w/Single Charger

1. **Refer to *3.3.1* to operate.**
2. **Set primary charger**. Tap **Account** > **Charger**. Select the charger connected to Bluetooth from the chargers list, then tap **Load Balancing** > **Adaptive Power Sharing + PV (Single)**. A brief description about this mode will appear on the screen. Tap **Set as Primary** to designate the charger as the primary charger.

3. **Set up PV Hybrid mode w/single charger**. After designating the primary charger, you need to complete the settings to configure PV Hybrid mode w/single charger.

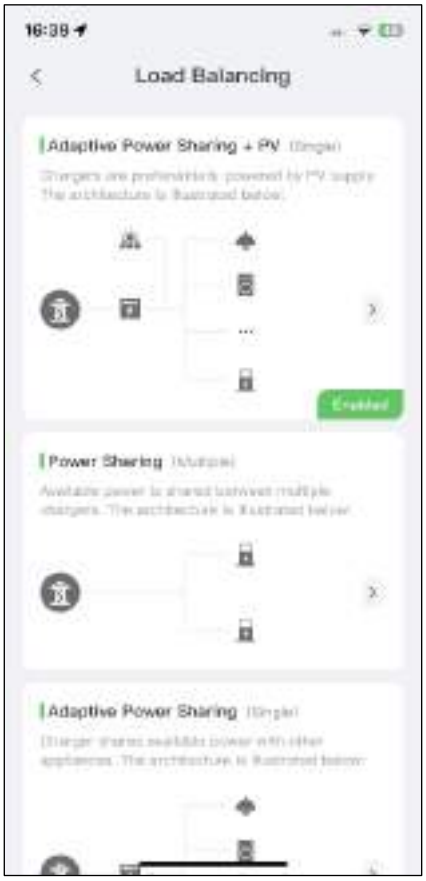
- ✓ **Smart Meter**: toggle the **Smart Meter** ON.
- ✓ **Available Power (kW)**: you need to enter the available power that the system can supply to the chargers. You must enter a whole number.

The value of the available power should be within the following range:

- ◆ Maximum Value: lower than upstream MCB/RCBO rated power.
- ◆ Minimum Value: higher than the minimum power of one charger (1.4 kW for single-phase, 4.2 kW for three-phase) x N (N represents the number of chargers in the device group).

- ✓ **Number of Phases**: select **Single-phase** or **Three-phase** based on your power supply mode.

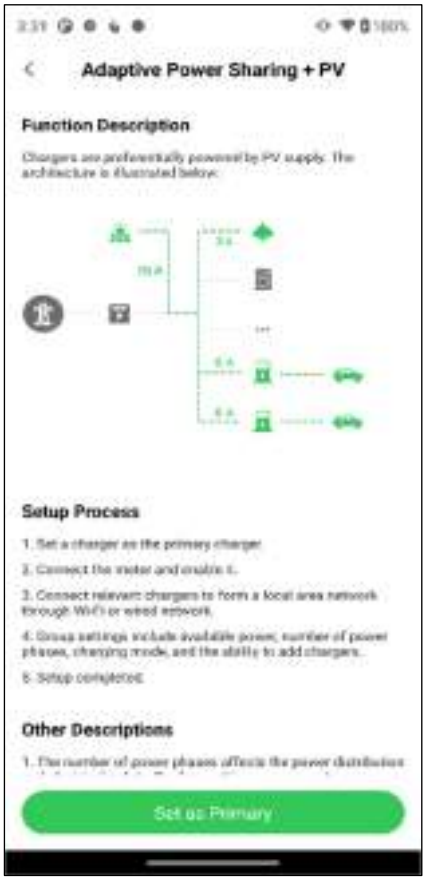
4. **Confirm configuration**. After all the settings above are completed, tap **Save** on the Adaptive Power Sharing + PV screen. The real-time charging details will display on the screen. Tap the "**<**" icon on the upper-left corner of the charging details screen to return to the mode selection screen. The **Enabled** tag will appear on this mode, indicating that PV Hybrid mode w/single charger is activated. Your charger can now be charged according to your settings.



4.1.5 Set up PV Mode w/Multiple Chargers

1. **Refer to *3.3.1* to operate.**
2. **Add secondary chargers**. Tap **Add** on the upper-right corner on the following screen and follow **STEP 3–4** in *3.3.1* to add more chargers and configure their Wi-Fi.

3. **Set primary charger**. Tap **Account** > **Charger**. Select the charger connected to Bluetooth from the chargers list, then tap **Load Balancing** > **Adaptive Power Sharing + PV (Multiple)**. A brief description about this mode will display on the screen. Tap **Set as Primary** to set the charger as primary charger.

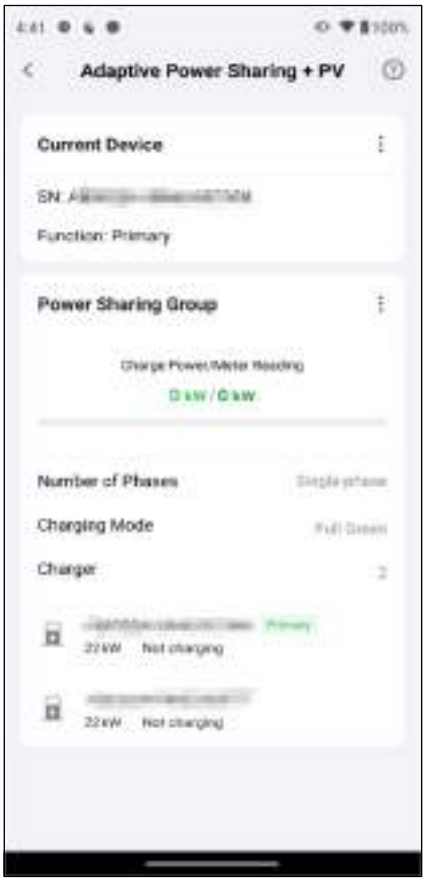


4. **Set up PV Hybrid mode w/multiple chargers**. After designating the primary charger, you need to complete the settings to configure PV Hybrid mode w/multiple chargers. There are three charging modes available. The settings vary depending on the charging modes.

a) Full Green Charging Mode

- ✓ **Smart Meter**: toggle the **Smart Meter** ON.
- ✓ **Number of Phases**: select **Single-phase** or **Three-phase** based on your power supply mode.
- ✓ **Charging Mode**: Select **Full Green** from the charging mode options.
- ✓ **Add Secondary Chargers**: tap **Add** to display other chargers connected to the same network. Tap **OK** once you have confirmed.

Tap **Save** once you have completed the settings. Then the real-time charging details will display on the screen.



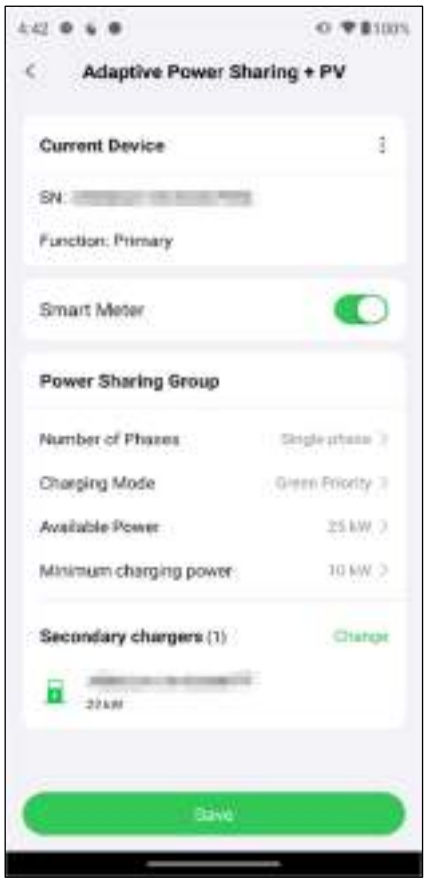
b) Green Priority Charging Mode

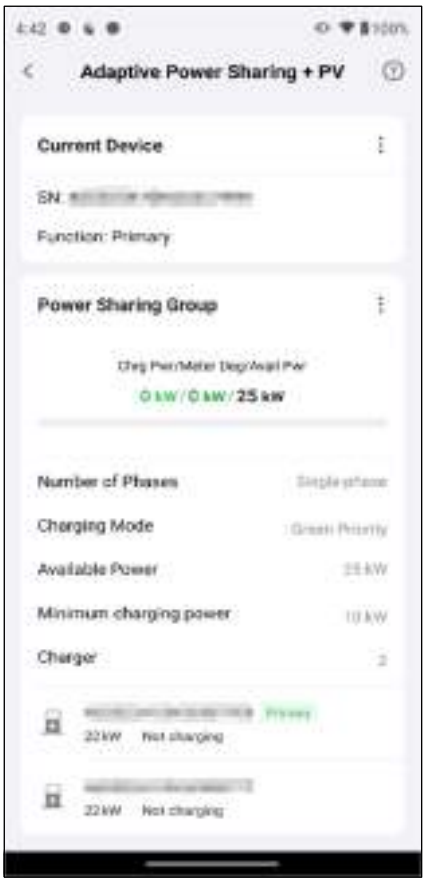
- ✓ **Smart Meter**: toggle the **Smart Meter** ON.
- ✓ **Number of Phases**: select **Single-phase** or **Three-phase** based on your power supply mode.
- ✓ **Charging Mode**: Select **Green Priority** from the charging mode options.
- ✓ **Available Power (kW)**: you need to enter the available power that the system can supply to the chargers. You must enter a whole number.

  The value of the available power should be within the following range:
  - ◆ Maximum Value: lower than upstream MCB/RCBO rated power.
  - ◆ Minimum Value: higher than the minimum power of one charger (1.4 kW for single-phase, 4.2 kW for three-phase) x N (N represents the number of chargers in the device group).

- ✓ **Minimum Charging Power (kW)**: the sum of the minimum charging power of all chargers.
- ✓ **Add Secondary Chargers**: tap **Add** to display other chargers connected to the same network. Tap **OK** once you have confirmed.

Tap **Save** once you have completed the settings. Then the real-time charging details will display on the screen.





c) Speed Priority Charging Mode

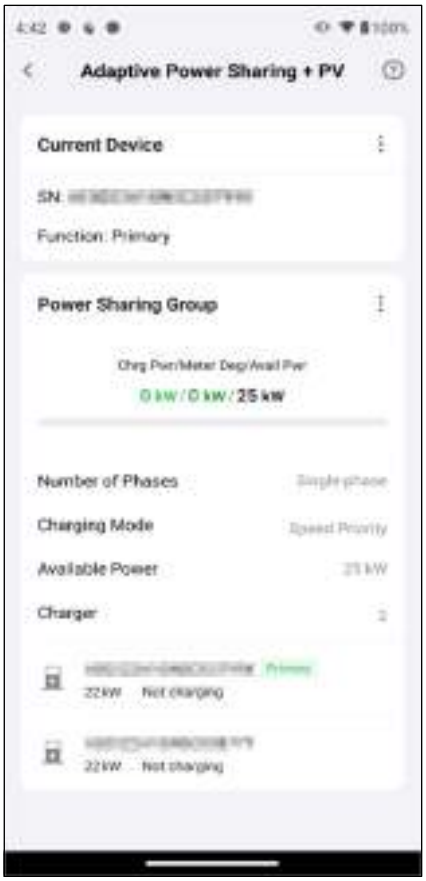
- ✓ **Smart Meter:** toggle the **Smart Meter** ON.
- ✓ **Number of Phases:** select **Single-phase** or **Three-phase** based on your power supply mode.
- ✓ **Charging Mode:** Select **Speed Priority** from the charging mode options.
- ✓ **Available Power (kW):** you need to enter the available power that the system can supply to the chargers. You must enter a whole number.

The value of the available power should be within the following range:

- ◆ Maximum Value: lower than upstream MCB/RCBO rated power.
- ◆ Minimum Value: higher than the minimum power of one charger (1.4 kW for single-phase, 4.2 kW for three-phase) x N (N represents the number of chargers in the device group).

- ✓ **Add Secondary Chargers:** tap **Add** to display other chargers connected to the same network. Tap **OK** once you have confirmed.

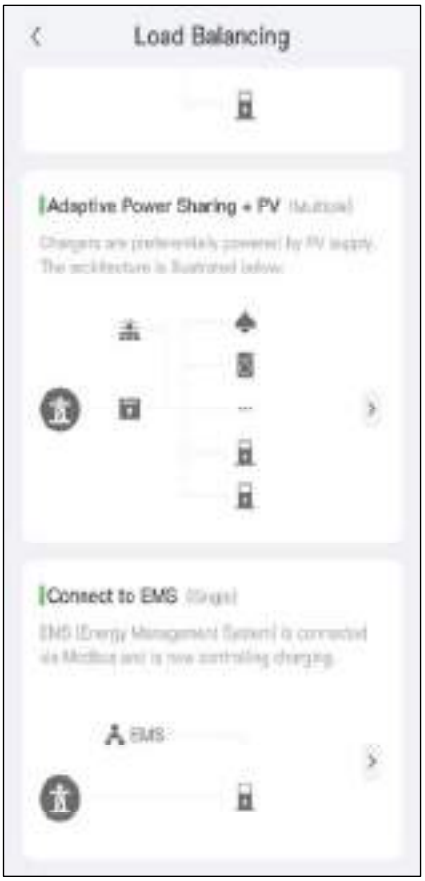
Tap **Save** once you have completed the settings. Then the real-time charging details will display on the screen.



5. **Confirm configuration**. Tap the "**<**" icon on the upper-left corner of the charging details screen to return to the mode selection screen. The **Enabled** tag will appear on this mode, indicating that PV Hybrid mode w/multiple chargers is activated. Your chargers can now be charged according to your settings.

4.1.6 Set up EMS Mode

1. **Refer to *3.3.1* to operate.**
2. **Start setting**. Tap **Account** > **Charger**. Select the charger from the chargers list, then tap **Load Balancing** > **Connect to EMS**. A brief description about this mode will appear on the screen. Tap **Start Setting** to continue.



3. **Select a connection mode**. The charger can be connected to the EMS as TCP server or TCP client. Select a connection mode based on the scenarios.

   ✓ If the charger is used as a TCP server, it acts as a host, waiting for the EMS to establish a connection and send requests or data. Select **Charger as server** to continue.

   ◆ Choose the desired method to access the IP address after selecting the Charger as server mode: **automatic** or **manual**. The automatic method allows for automatic retrieval of the IP address, subnet mask, and gateway. On the other hand, the manual method requires manual input of these details.

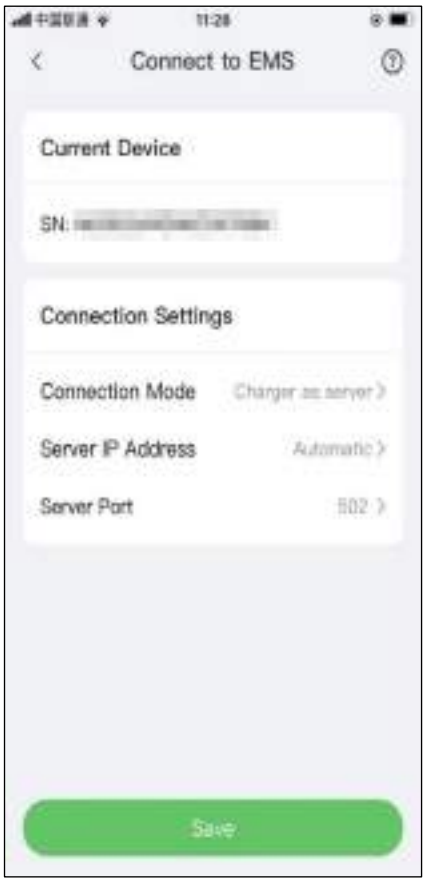
When choose the manual method, obtain the IP Address, Subnet Mask, and Default Gateway of the charger by following the steps below:

1) Connect your personal computer to the Wi-Fi of the router (or connect one end of an Ethernet cable to your personal computer and the other end to the router).

2) Launch the browser on the computer and enter the URL of the router to log in to the web console.

3) Check and record the IP Address of the charger for the follow-up configuration.

Input the port number and tap **Save** to finish the setup.



✓ If the charger is used as a TCP client, it initiates the connection to the EMS. Select **Charger as client** to continue. Input the server IP address and port number, then tap **Save** to finish the setup.

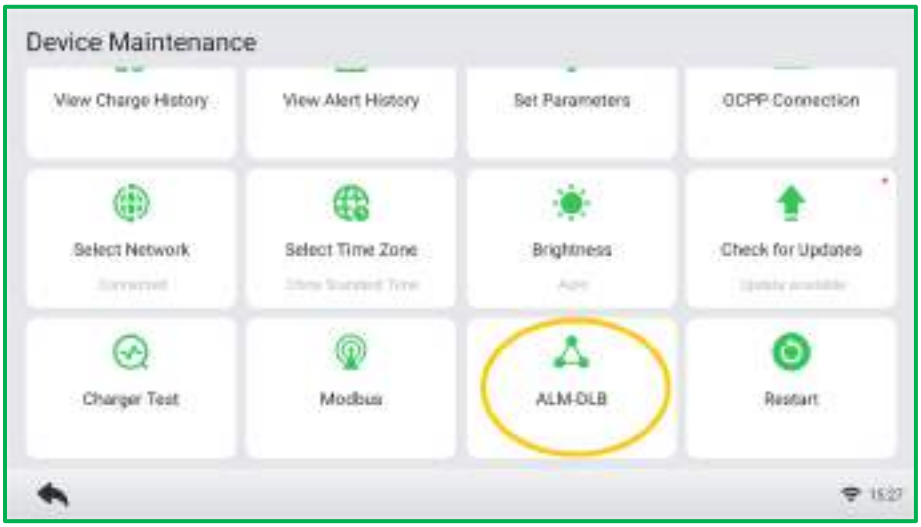
NOTE
The Modbus TCP server port is 502 by default.

4. **Confirm configuration**. Tap the "**<**" icon on the upper-left corner of the Connect to EMS screen to return to the Load Balancing screen. The **Enabled** tag will appear on this mode, indicating that the charger has been successfully connected to the EMS.

4.2 For Scenario with AC Ultra/DC Compact/DC Fast

4.2.1 Set up DLB mode

1. Refer to **STEP 1-4** in *3.3.2* to enter the **Device Maintenance** screen. Then select **ALM-DLB.**



2. **Set secondary charger**.

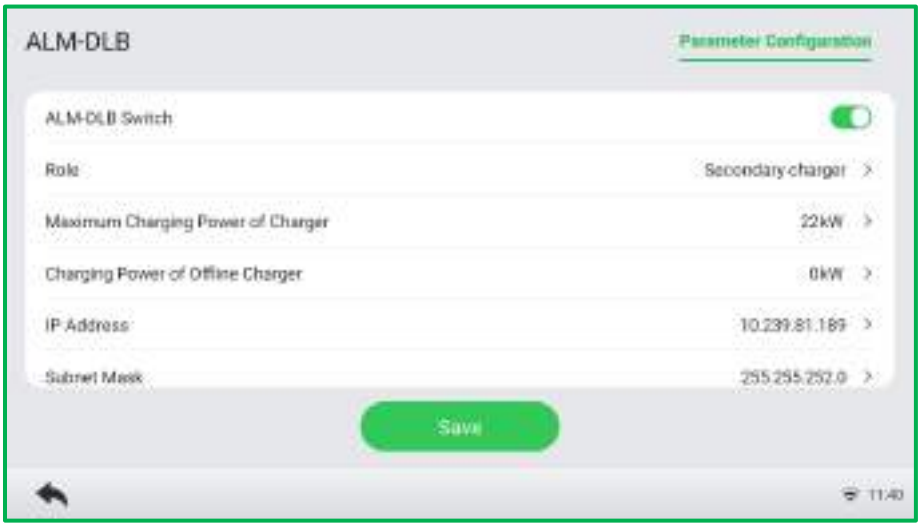
   1) Enable **ALM-DLB Switch** as shown below.

   2) Click on "**>**" to the right of the **Role** and select **Secondary charger**.

   3) Configure the parameters of **Maximum Charging Power of Charger** and **Charging Power of Offline Charger**.

      ✓ **Maximum Charging Power of Charger (kW)**: lower than the rated power of the charger.

      ✓ **Charging Power of Offline Charger (kW)**: this value is 0 by default.



   4) **Record the IP Address** for the follow-up configuration and click on the **Save** button to save the setup.

   5) Set the remaining secondary chargers and configure their parameters successively according to the previous steps.

3. **Set primary charger**.

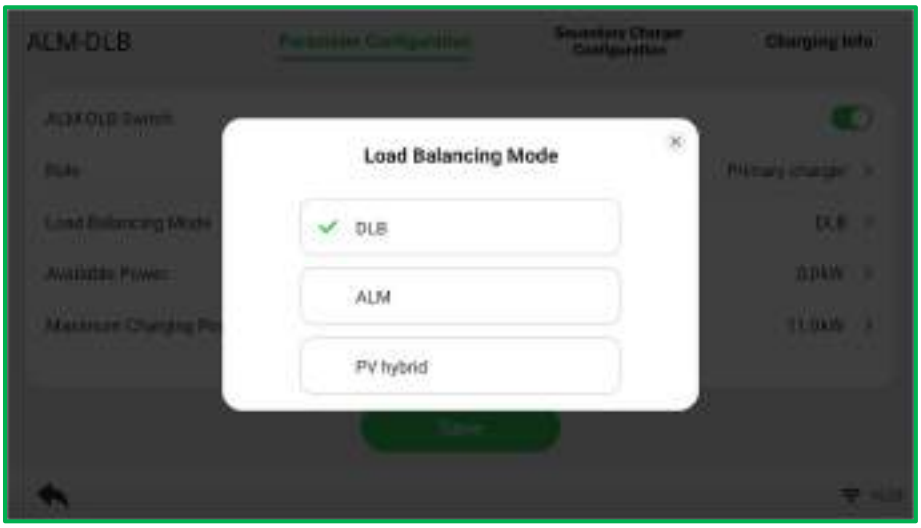
1) Refer to **STEP 1** to operate.

2) Enable **ALM-DLB Switch** as shown below.

3) Click on "**>**" to the right of the **Role** and select **Primary charger**.

4. **Set up DLB mode.**

1) Click on "**>**" to the right of the of the **Load Balancing Mode** and select **DLB**.



2) Configure the parameters of **Available Power** and **Maximum Charging Power of Charger**.

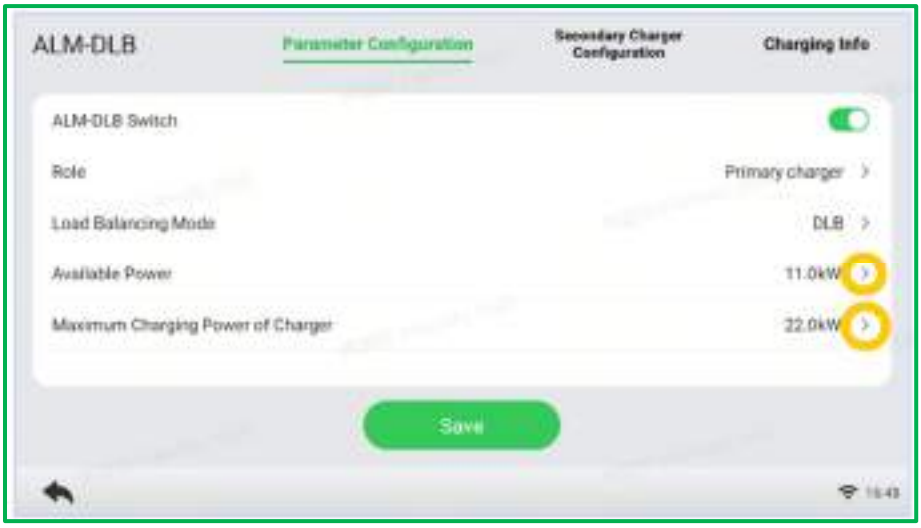
✓ **Available Power (kW)**: You must enter the available power that the system can supply to the chargers. This value must be expressed as a whole number.

The value of the available power should be within the following range:

- Maximum Value: lower than the upstream MCB/RCBO rated power.
- Minimum Value: higher than the minimum power of one charger (1.4 kW for single-phase, 4.2 kW for three-phase) x N (N represents the number of chargers in the device group).

✓ **Maximum Charging Power of Charger**: lower than the rated power of the charger.

Click on the **Save** button to save the settings.

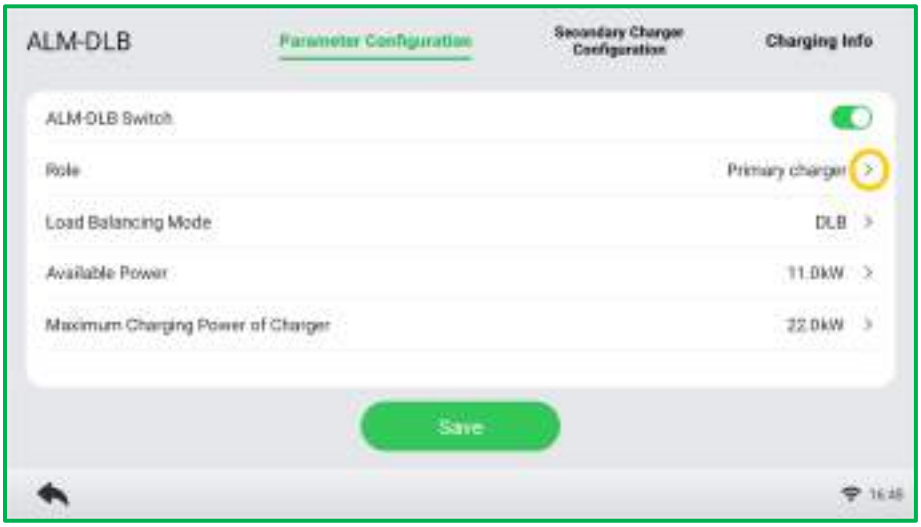


5. **Add secondary charger**. Tap on **Secondary Charger Configuration** and click on **Add Secondary Charger**. Add the recorded IP address and click on the **Save** button to save the setup.

6. **Confirm configuration.** After all the setups above are completed, tap on **Charging Information** to confirm the configuration of the selected operating mode.

4.2.2 Set up ALM Mode w/Single Charger

1. **Refer to STEP 1 in *4.2.1* to operate.**
2. **Set primary charger**. Enable **ALM-DLB Switch** as shown below. Then click on "**>**" to the right of the **Role** and select **Primary charger**.



3. **Set up ALM mode**. On the same screen, click on "**>**" to the right of the of the **Load Balancing Mode** and select **ALM**.

1) Click on "**>**" to the right of the **Meter Type** and select the meter.

2) Configure the parameters of **Available Power**, **Reserved Power Percentage**, **Maximum Charging Power of Charger**, and **Charging Power for Offline Meter**.

- ✓ **Available Power (kW)**: you need to enter the available power that the system can supply to the chargers. You must enter a whole number.

  The value of the available power should be within the following range:
  - ◆ Maximum Value: lower than the upstream MCB/RCBO rated power.
  - ◆ Minimum Value: higher than the minimum power of one charger (1.4 kW for single-phase, 4.2 kW for three-phase) x N (N represents the number of chargers in the device group).

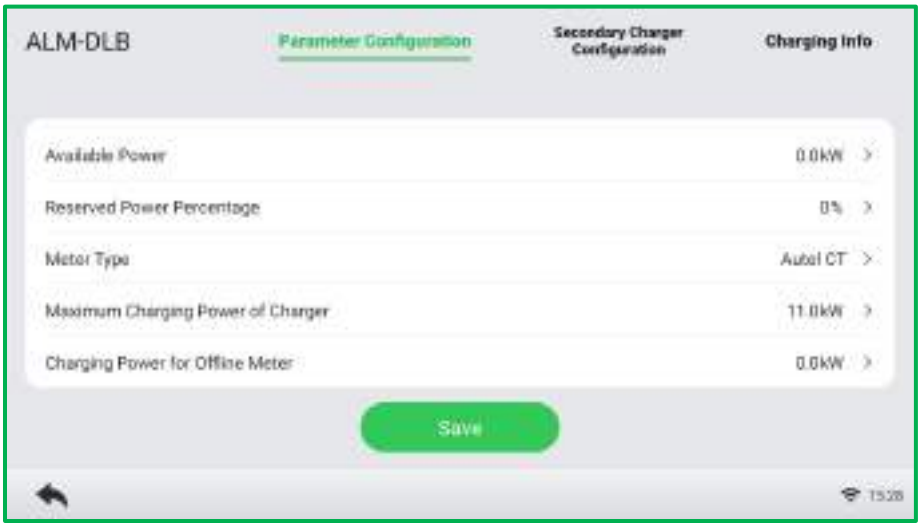
- ✓ **Reserved Power Percentage**: you must enter the power reserve for the charger, namely the reserved power not used for charging.
  - ◆ The range of the power reserve is from 0–50%. The maximum reserved power that can be entered is 50% of the total home power.

- The default setting of the power reserve is 10%, which is used for the dynamic power change caused by load switching in and out.

✓ **Maximum Charging Power of Charger**: lower than the rated power of the charger.

✓ **Charging Power for Offline Meter**: the default charging power for offline meter is 10% of the available power.

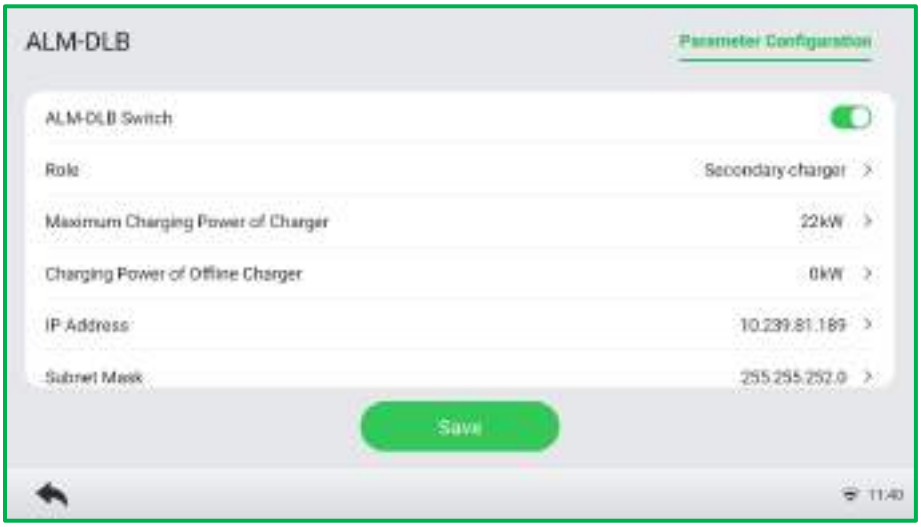
Tap **Save** once you have completed the settings.



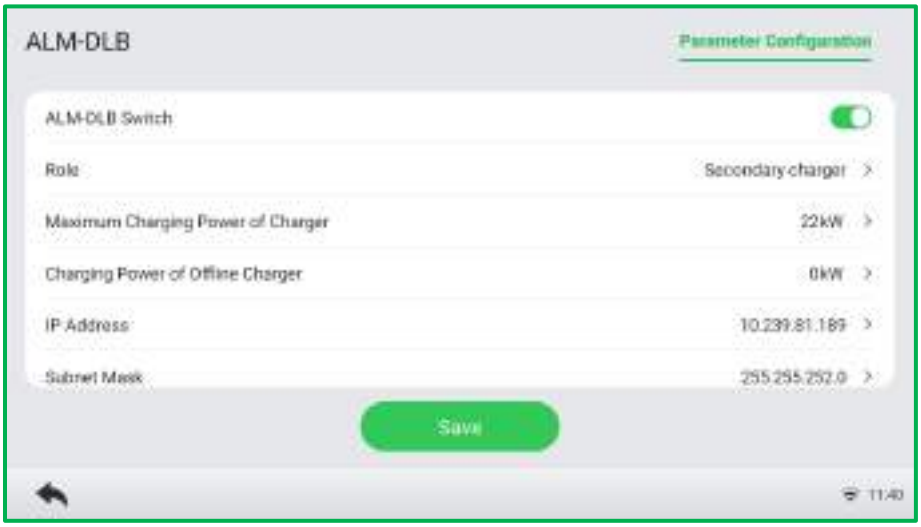
4. **Confirm configuration**. After all the setups above are completed, tap on **Charging Information** to confirm the configuration of the selected operating mode.

4.2.3 Set up ALM Mode w/Multiple Chargers

1. **Refer to STEP 1 in *4.2.1* to operate.**
2. **Set secondary charger**.
   1) Enable **ALM-DLB Switch** as shown below.
   2) Click on "**>**" to the right of the **Role** and select **Secondary charger**.



   3) Configure the parameters of **Maximum Charging Power of Charger** and **Charging Power of Offline Charger**.
      - ✓ **Maximum Charging Power of Charger (kW)**: lower than the rated power of the charger.
      - ✓ **Charging Power of Offline Charger (kW)**: this value is 0 by default.



   4) **Record the IP Address** for the follow-up configuration and click on the **Save** button to save the setup.
   5) Set the remaining secondary chargers and configure their parameters successively according to the previous steps.

3. Set primary charger.

1) Refer to **STEP 1** in *4.2.1* to operate.

2) Enable **ALM-DLB Switch** as shown below.

3) Click on "**>**" to the right of the **Role** and select **Primary charger**.

4. Set up ALM mode.

1) Click on "**>**" to the right of the of the **Load Balancing Mode** and select **ALM**.

2) Click on "**>**" to the right of the **Meter Type** and select the meter.

3) Configure the parameters of **Available Power**, **Reserved Power Percentage**, **Maximum Charging Power of Charger** and **Charging Power for Offline Meter**.

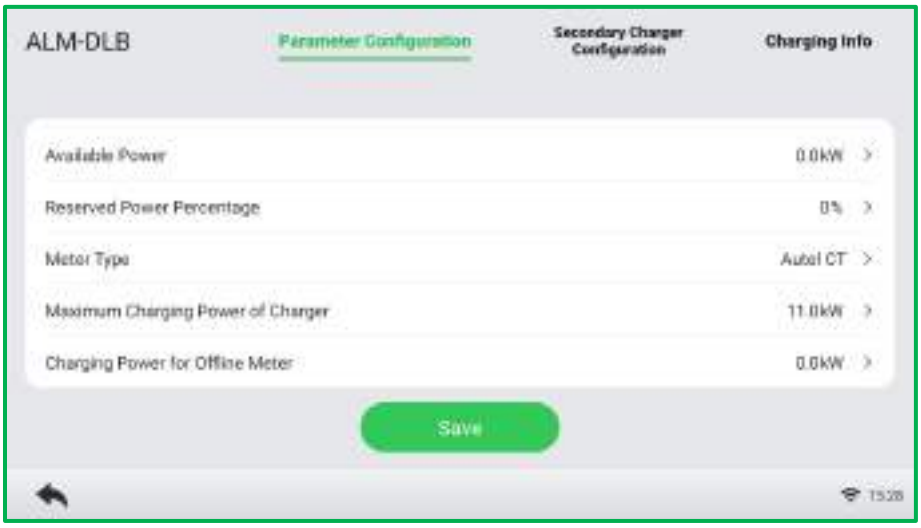
- ✓ **Available Power (kW)**: you need to enter the available power that the system can supply to the chargers. You must enter a whole number.

  The value of the available power should be within the following range:
  - ◆ Maximum Value: lower than the upstream MCB/RCBO rated power.
  - ◆ Minimum Value: higher than the minimum power of one charger (1.4 kW for single-phase, 4.2 kW for three-phase) x N (N represents the number of chargers in the device group).

- ✓ **Reserved Power Percentage**: you must enter the power reserve for the charger, namely the reserved power not used for charging.
  - ◆ The range of the power reserve is from 0–50%. The maximum reserved power that can be entered is 50% of the total home power.
  - ◆ The default setting of the power reserve is 10%, which is used for the dynamic power change caused by load switching in and out.

- ✓ **Maximum Charging Power of Charger**: lower than the rated power of the charger.
- ✓ **Charging Power for Offline Meter**: the default charging power for offline meter is 10% of the available power.

  Click on the **Save** button to save the settings.

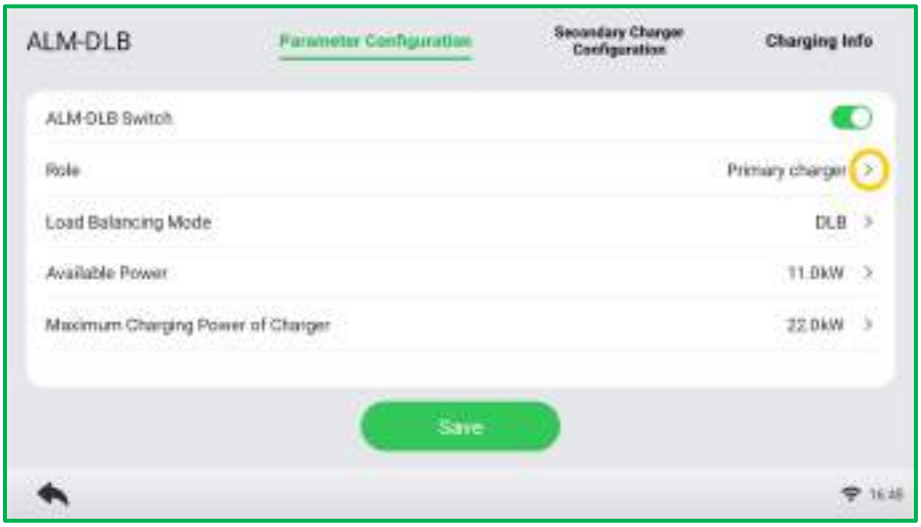


5. **Add secondary charger**. Tap on **Secondary Charger Configuration** and click on **Add Secondary Charger**. Add the secondary charger by inputting the recorded IP address and click on the **Save** button to save the setup.

6. **Confirm configuration.** After all the setups above are completed, tap on **Charging Information** to confirm the configuration of the selected operating mode.

4.2.4 Set up PV Hybrid Mode w/Single Charger

1. **Refer to STEP 1 in *4.2.1* to operate.**
2. **Set primary charger**. Enable **ALM-DLB Switch** as shown below. Then click on "**>**" to the right of the **Role** and select **Primary charger**.



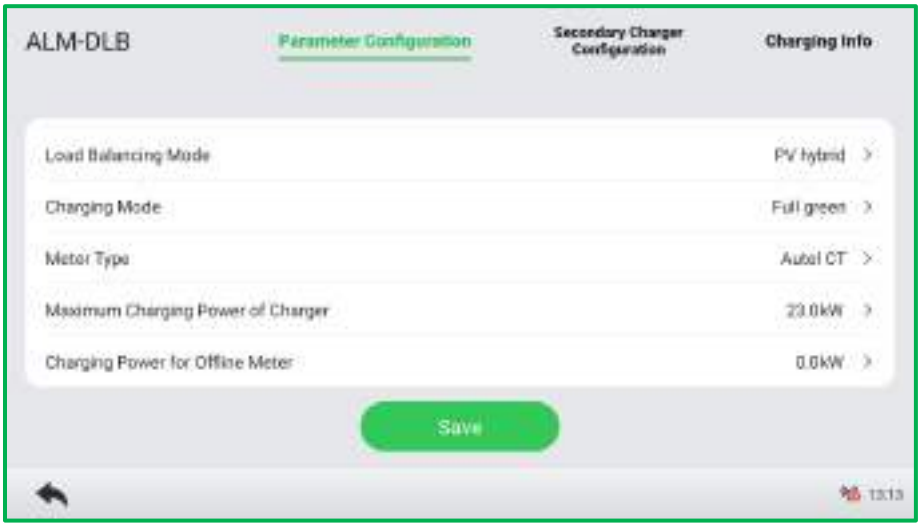
3. **Set up PV hybrid mode**. On the same screen, click on "**>**" to the right of the of the **Load Balancing Mode** and select **PV Hybrid**.

There are three charging modes available. The settings vary depending on the charging modes.

a) Full Green Charging Mode

- ✓ **Charging Mode**: Select **Full Green** from the charging mode options.
- ✓ **Meter Type**: Select the meter from the meter type options.
- ✓ **Maximum Charging Power of Charger**: lower than the rated power of the charger.
- ✓ **Charging Power for Offline Meter**: the default charging power for offline meter is 10% of the available power.

Tap **Save** once you have completed the settings.



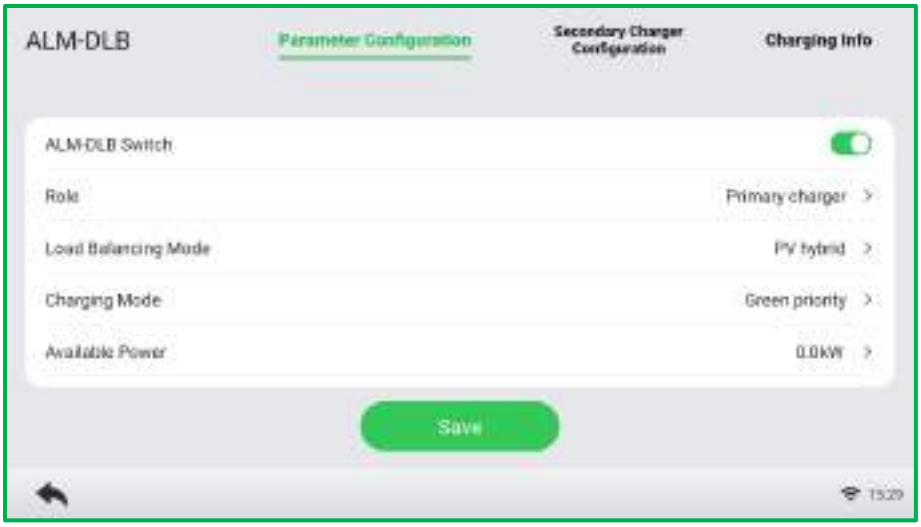
b) Green Priority Charging Mode

- ✓ **Charging Mode**: Select **Green Priority** from the charging mode options.
- ✓ **Available Power (kW)**: you need to enter the available power that the system can supply to the chargers. You must enter a whole number.

  The value of the available power should be within the following range:
  - ◆ Maximum Value: lower than the upstream MCB/RCBO rated power.
  - ◆ Minimum Value: higher than the minimum power of one charger (1.4 kW for single-phase, 4.2 kW for three-phase) x N (N represents the number of chargers in the device group).

- ✓ **Meter Type**: Select the meter from the meter type options.
- ✓ **Maximum Charging Power of Charger (kW)**: lower than the rated power of the charger.
- ✓ **Minimum Charging Power (kW)**: the sum of the minimum charging power of all chargers.
- ✓ **Charging Power for Offline Meter (kW)**: the default charging power for offline meter is 10% of the available power.

  Tap **Save** once you have completed the settings.



c) Speed Priority Charging Mode

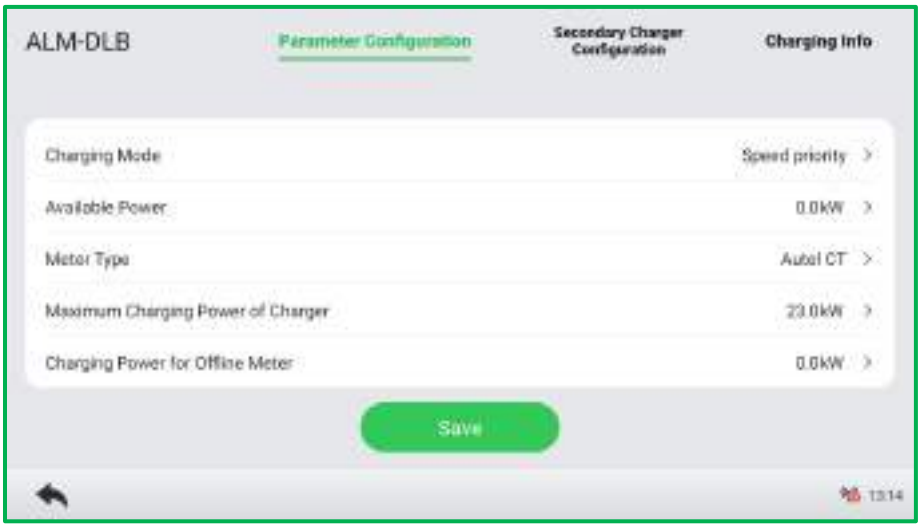
- ✓ **Charging Mode**: Select **Speed Priority** from the charging mode options.
- ✓ **Available Power (kW)**: you need to enter the available power that the system can supply to the chargers. You must enter a whole number.

The value of the available power should be within the following range:

- ◆ Maximum Value: lower than the upstream MCB/RCBO rated power.
- ◆ Minimum Value: higher than the minimum power of one charger (1.4 kW for single-phase, 4.2 kW for three-phase) x N (N represents the number of chargers in the device group).

- ✓ **Meter Type**: Select the meter from the meter type options.
- ✓ **Maximum Charging Power of Charger(kW)**: lower than the rated power of the charger.
- ✓ **Charging Power for Offline Meter (kW)**: the default charging power for offline meter is 10% of the available power.

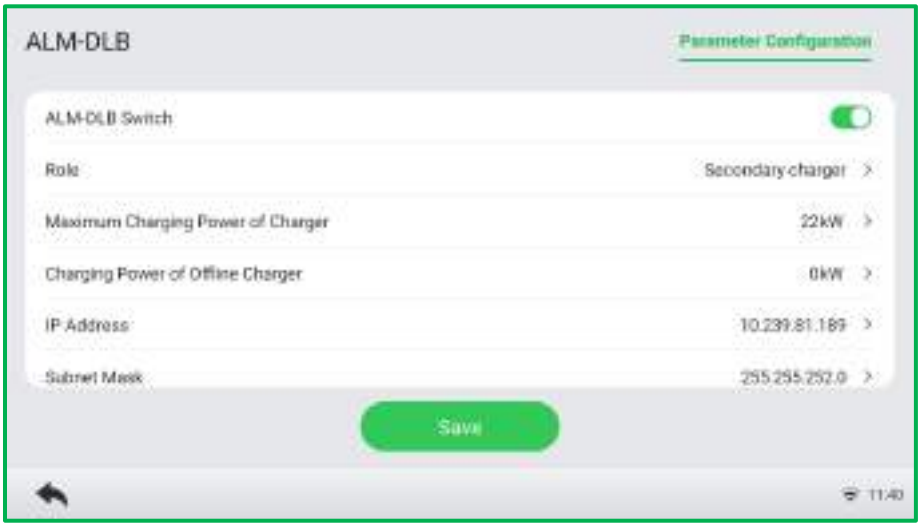
Tap **Save** once you have completed the settings.



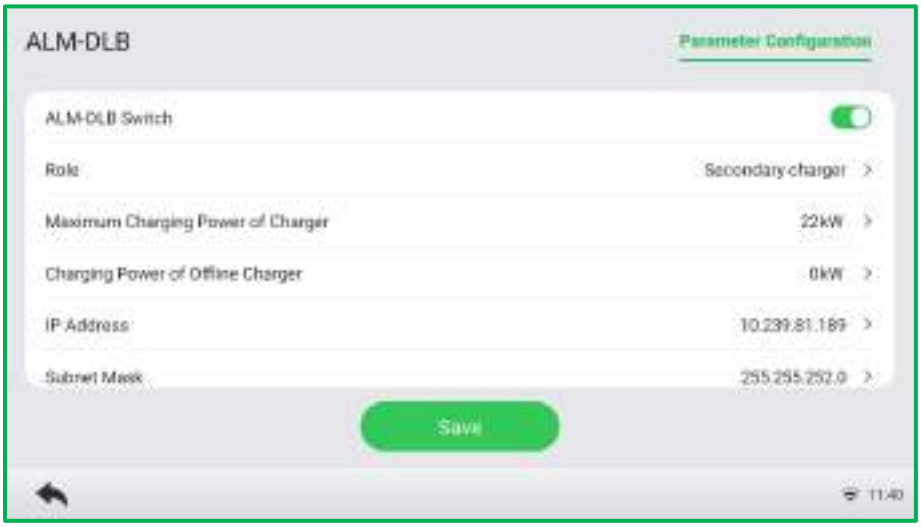
4. **Confirm configuration**. After all the setups above are completed, tap on **Charging Information** to confirm the configuration of the selected operating mode.

4.2.5 Set up PV Hybrid Mode w/Multiple Chargers

1. **Refer to STEP 1 in *4.2.1* to operate.**
2. **Set secondary charger**.
   1) Enable **ALM-DLB Switch** as shown below.
   2) Click on "**>**" to the right of the **Role** and select **Secondary charger**.



   3) Configure the parameters of **Maximum Charging Power of Charger** and **Charging Power of Offline Charger**.
      - ✓ **Maximum Charging Power of Charger (kW)**: lower than the rated power of the charger.
      - ✓ **Charging Power of Offline Charger (kW)**: this value is 0 by default.



   4) **Record the IP Address** for the follow-up configuration and click on the **Save** button to save the setup.
   5) Set the remaining secondary chargers and configure their parameters successively according to the previous steps.

3. **Set primary charger.**

   1) Refer to **STEP 1** in *4.2.1* to operate.

   2) Enable **ALM-DLB Switch** as shown below.

   3) Click on "**>**" to the right of the **Role** and select **Primary charger**.

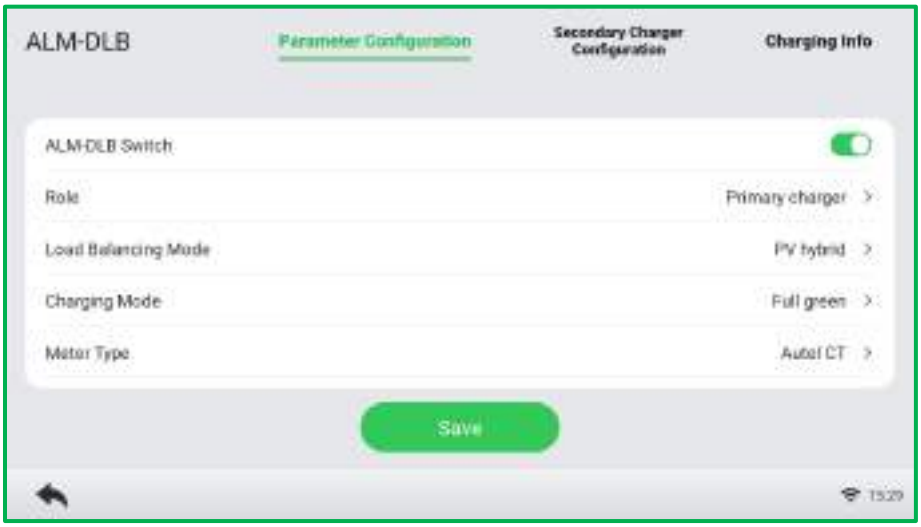
4. **Set up PV Hybrid mode.** Click on "**>**" to the right of the of the **Load Balancing Mode** and select **PV Hybrid**.

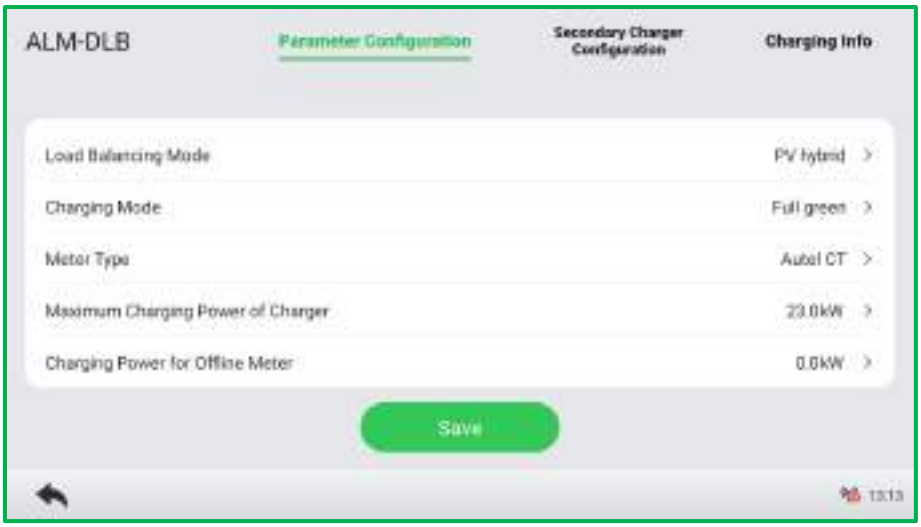
There are three charging modes available. The settings vary depending on the charging modes.

a) Full Green Charging Mode

- ✓ **Charging Mode**: Select **Full Green** from the charging mode options.
- ✓ **Meter Type**: Select the meter from the meter type options.
- ✓ **Maximum Charging Power of Charger**: lower than the rated power of the charger.
- ✓ **Charging Power for Offline Meter**: the default charging power for offline meter is 10% of the available power.

Tap **Save** once you have completed the settings.





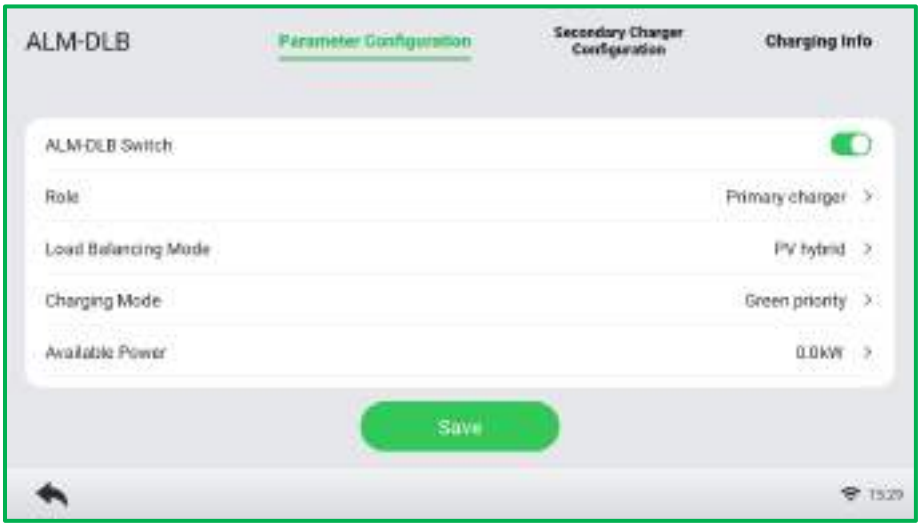
b) Green Priority Charging Mode

- ✓ **Charging Mode**: Select **Green Priority** from the charging mode options.
- ✓ **Available Power (kW)**: you need to enter the available power that the system can supply to the chargers. You must enter a whole number.

  The value of the available power should be within the following range:
  - ◆ Maximum Value: lower than the upstream MCB/RCBO rated power.
  - ◆ Minimum Value: higher than the minimum power of one charger (1.4 kW for single-phase, 4.2 kW for three-phase) x N (N represents the number of chargers in the device group).

- ✓ **Meter Type**: Select the meter from the meter type options.
- ✓ **Maximum Charging Power of Charger (kW)**: lower than the rated power of the charger.
- ✓ **Minimum Charging Power (kW)**: the sum of the minimum charging power of all chargers.
- ✓ **Charging Power for Offline Meter (kW)**: the default charging power for offline meter is 10% of the available power.

Tap **Save** once you have completed the settings.



c) Speed Priority Charging Mode

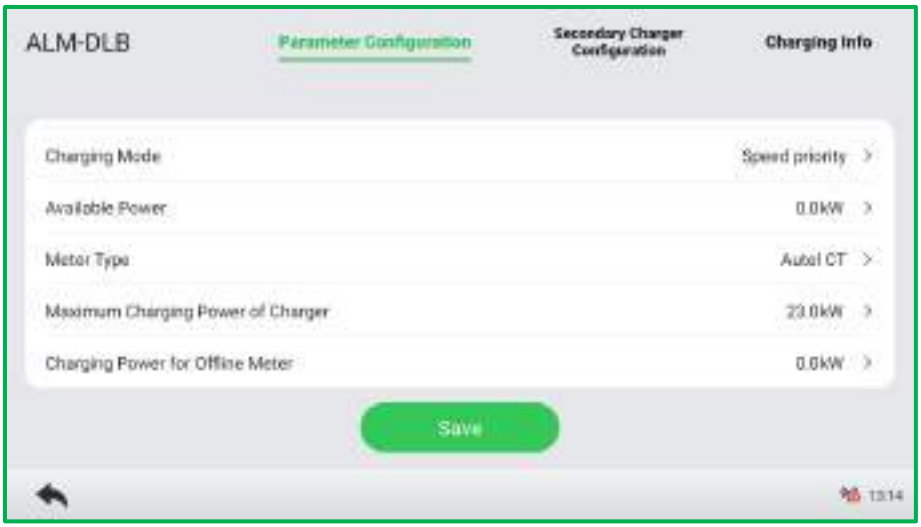
- ✓ **Charging Mode**: Select **Speed Priority** from the charging mode options.
- ✓ **Available Power (kW)**: you need to enter the available power that the system can supply to the chargers. You must enter a whole number.

The value of the available power should be within the following range:

- ◆ Maximum Value: lower than the upstream MCB/RCBO rated power.
- ◆ Minimum Value: higher than the minimum power of one charger (1.4 kW for single-phase, 4.2 kW for three-phase) x N (N represents the number of chargers in the device group).

- ✓ **Meter Type**: Select the meter from the meter type options.
- ✓ **Maximum Charging Power of Charger(kW)**: lower than the rated power of the charger.
- ✓ **Charging Power for Offline Meter (kW)**: the default charging power for offline meter is 10% of the available power.

Tap **Save** once you have completed the settings.

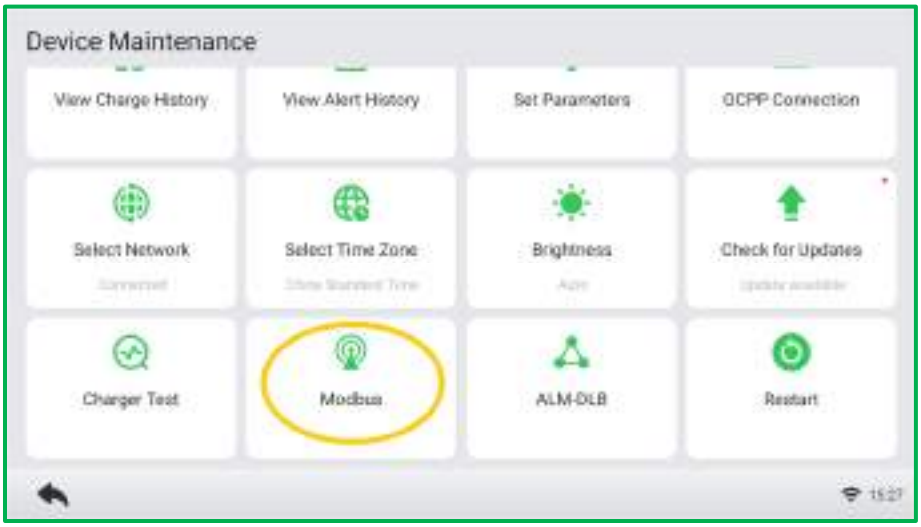


5. **Add secondary charger**. Tap on **Secondary Charger Configuration** and click on **Add Secondary Charger**. Add the secondary charger by inputting the recorded IP address and click on the **Save** button to save the setup.

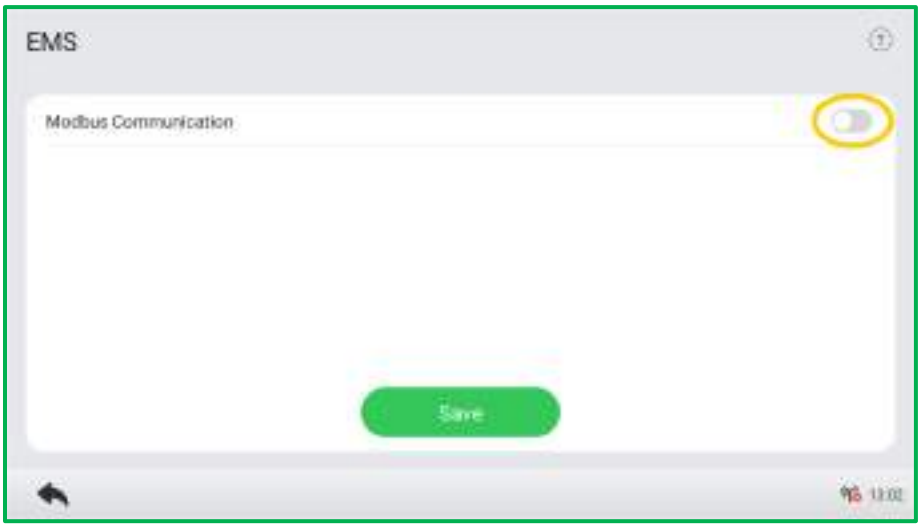
6. **Confirm configuration.** After all the setups above are completed, tap on **Charging Information** to confirm the configuration of the selected operating mode.

4.2.6 Set up EMS Mode

1. **Refer to STEP 1-4** in *3.3.2* to enter the **Device Maintenance** screen.
2. On the Device Maintenance screen, select **Modbus**.



3. Toggle the **Modbus Communication** ON.



4. **Select a connection mode**. The charger can be connected to the EMS as TCP server or TCP client. Select a connection mode based on the scenarios.

✓ If the charger is used as a TCP server, it acts as a host, waiting for the EMS to establish a connection and send requests or data. Select **Charger as server** to continue.

◆ Choose the desired method to access the IP address after selecting the Charger as server mode: **automatic** or **manual**. The automatic method allows for automatic retrieval of the IP address, subnet mask, and gateway. On the other hand, the manual method requires manual input of these details.

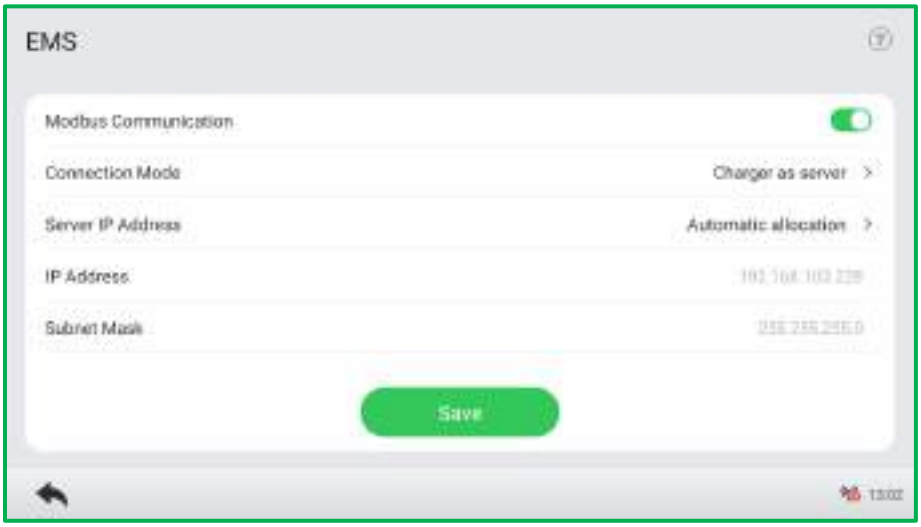
When choose the manual method, obtain the IP Address, Subnet Mask, and Default Gateway of the charger by following the steps below:

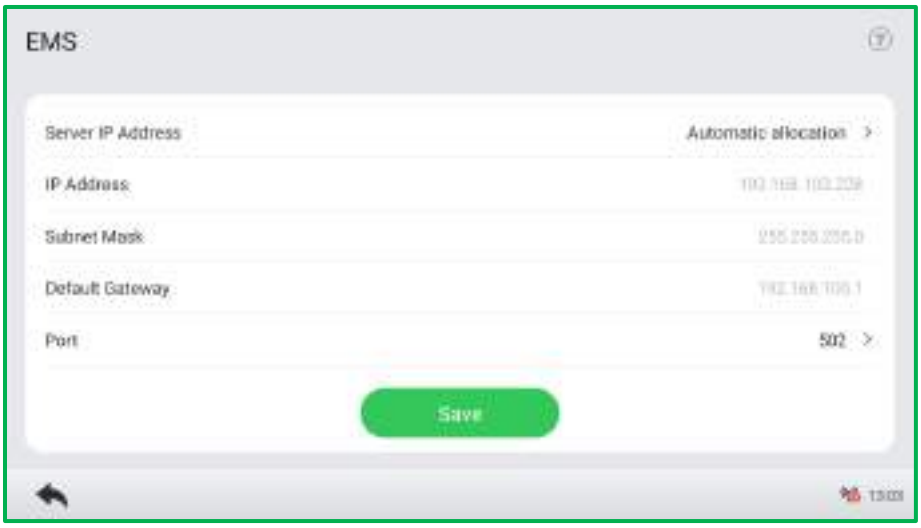
1) Connect your personal computer to the Wi-Fi of the router (or connect one end of an Ethernet cable to your personal computer and the other end to the router).

2) Launch the browser on the computer and enter the URL of the router to log in to the web console.

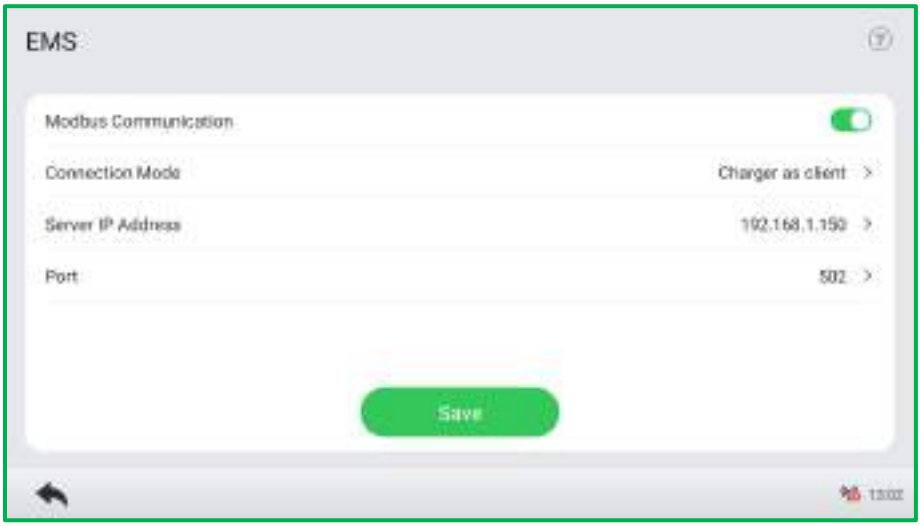
3) Check and record the IP Address of the charger for the follow-up configuration.

Input the port number and tap **Save** to finish the setup.





✓ If the charger is used as a TCP client, it initiates the connection to the EMS. Select **Charger as client** to continue. Input the server IP address and port number, then tap **Save** to finish the setup.



NOTE
The Modbus TCP server port is 502 by default.

4.3 For Scenarios with Chargers of Different Models

Follow the steps below to activate the operating modes for the following scenarios:

- AC Ultra + AC Wallbox/AC Compact
- DC Compact/DC Fast + AC Wallbox/AC Compact

4.3.1 Set up DLB Mode

1. **Refer to *3.3.1* to operate.**
2. **Start setting**. Tap **Account** > **Charger**. Select the charger from the chargers list, then tap **Load Balancing** > **Connect to EMS**. A brief description about this mode will appear on the screen. Tap **Start Setting** to continue.

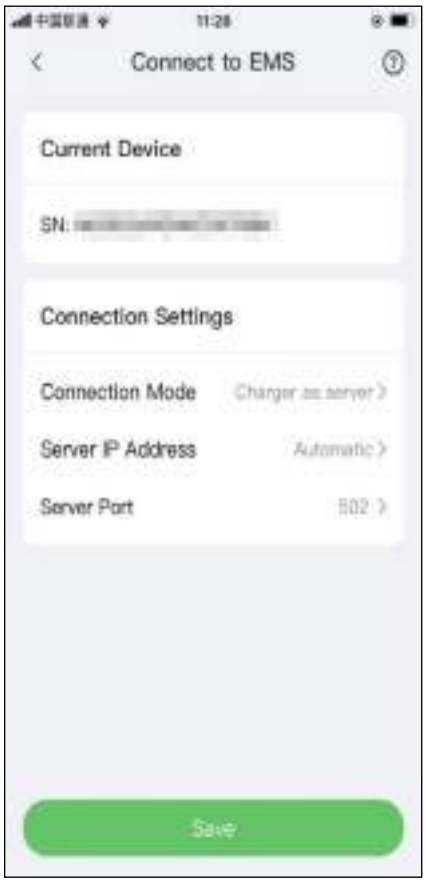
3. Set the Connection Mode to **Charger as server**. Choose **Manual** method to access the IP Address and input the IP Address, Subnet Mask, Default Gateway, and Server Port.

Obtain the IP Address, Subnet Mask, and Default Gateway of the charger by following the steps below:

1) Connect your personal computer to the Wi-Fi of the router (or connect one end of an Ethernet cable to your personal computer and the other end to the router).

2) Launch the browser on the computer and enter the URL of the router to log in to the web console.

3) Check and record the IP Address, Subnet Mask, and Default Gateway of the charger for the follow-up configuration.



NOTE
The Modbus TCP server port is 502 by default.

4. **Record the IP Address** for the follow-up configuration and tap **Save** to finish the setup.

5. **Confirm configuration**. Tap the "**<**" icon on the upper-left corner of the Connect to EMS screen to return to the Load Balancing screen. The **Enabled** tag will appear on this mode, indicating that the charger has been successfully connected to the EMS.

6. **Set primary charger.**

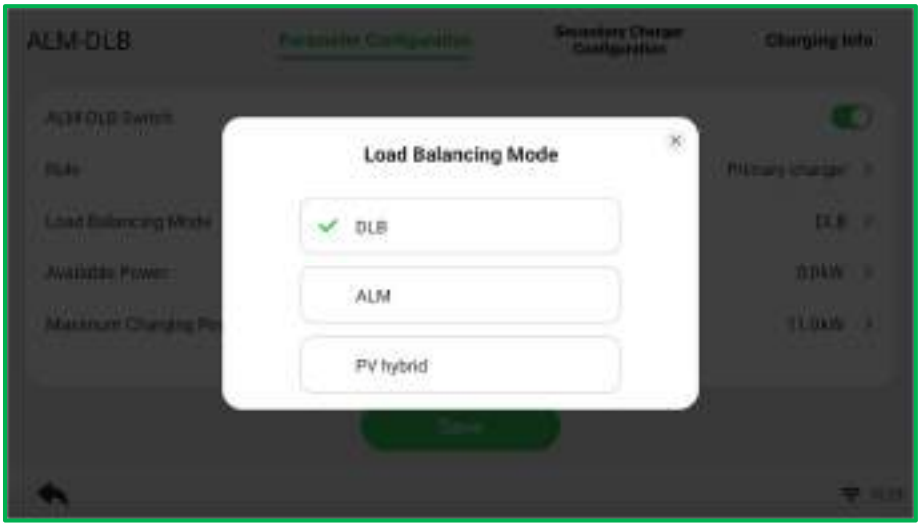
   1) Refer to **STEP 1 in** ***4.2.1*** to operate.

   2) Enable **ALM-DLB Switch** as shown below.

   3) Click on "**>**" to the right of the **Role** and select **Primary charger**.

7. Set up DLB mode.

1) Click on "**>**" to the right of the of the **Load Balancing Mode** and select **DLB**.



2) Configure the parameters of **Available Power** and **Maximum Charging Power of Charger**.

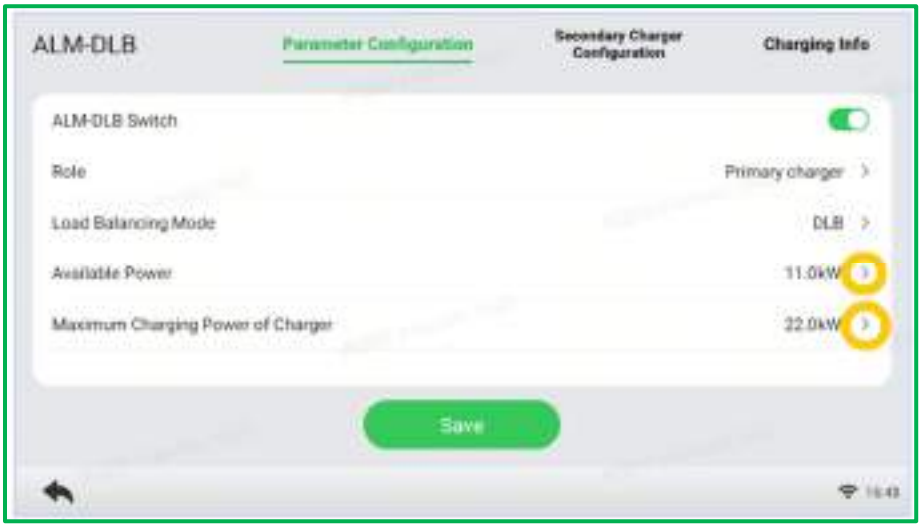
✓ **Available Power (kW)**: You must enter the available power that the system can supply to the chargers. This value must be expressed as a whole number.

The value of the available power should be within the following range:

- Maximum Value: lower than the upstream MCB/RCBO rated power.
- Minimum Value: higher than the minimum power of one charger (1.4 kW for single-phase, 4.2 kW for three-phase) x N (N represents the number of chargers in the device group).

✓ **Maximum Charging Power of Charger**: lower than the rated power of the charger.

Click on the **Save** button to save the settings.



8. **Add secondary charger**. Tap on **Secondary Charger Configuration** and click on **Add Secondary Charger**. Add the secondary charger by inputting the recorded IP address and click on the **Save** button to save the setup.

9. **Confirm configuration**. After all the setups above are completed, tap on **Charging Information** to confirm the configuration of the selected operating mode.

4.3.2 Set up ALM Mode w/Multiple Chargers

1. **Refer to STEP 1-5 in *4.3.1* to operate.**
2. **Set primary charger.**
   1) Refer to **STEP 1** in *4.2.1* to operate.
   2) Enable **ALM-DLB Switch** as shown below.
   3) Click on "**>**" to the right of the **Role** and select **Primary charger**.

3. **Set up ALM mode.**
   1) Click on "**>**" to the right of the of the **Load Balancing Mode** and select **ALM**.

2) Click on "**>**" to the right of the **Meter Type** and select the meter.

3) Configure the parameters of **Available Power**, **Reserved Power Percentage**, **Maximum Charging Power of Charger**, and **Charging Power for Offline Meter**.

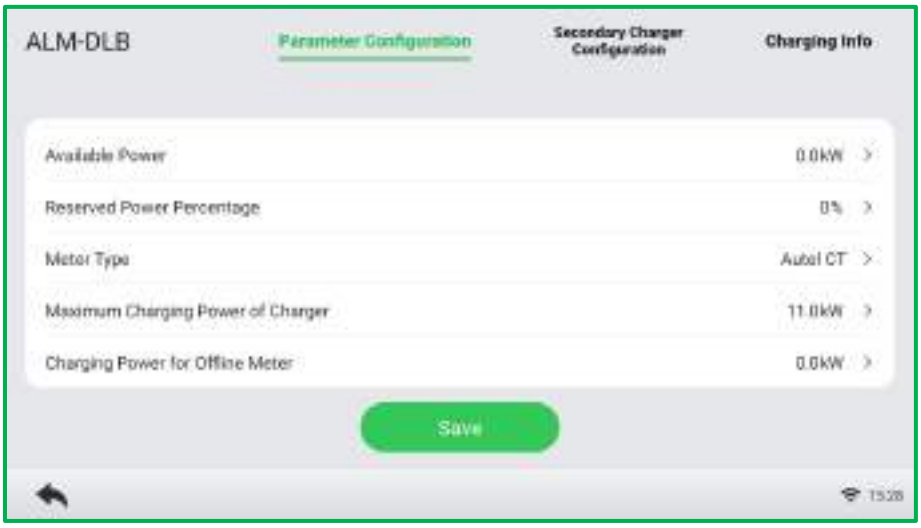
- ✓ **Available Power (kW)**: you need to enter the available power that the system can supply to the chargers. You must enter a whole number.

  The value of the available power should be within the following range:
  - ◆ Maximum Value: lower than the upstream MCB/RCBO rated power.
  - ◆ Minimum Value: higher than the minimum power of one charger (1.4 kW for single-phase, 4.2 kW for three-phase) x N (N represents the number of chargers in the device group).

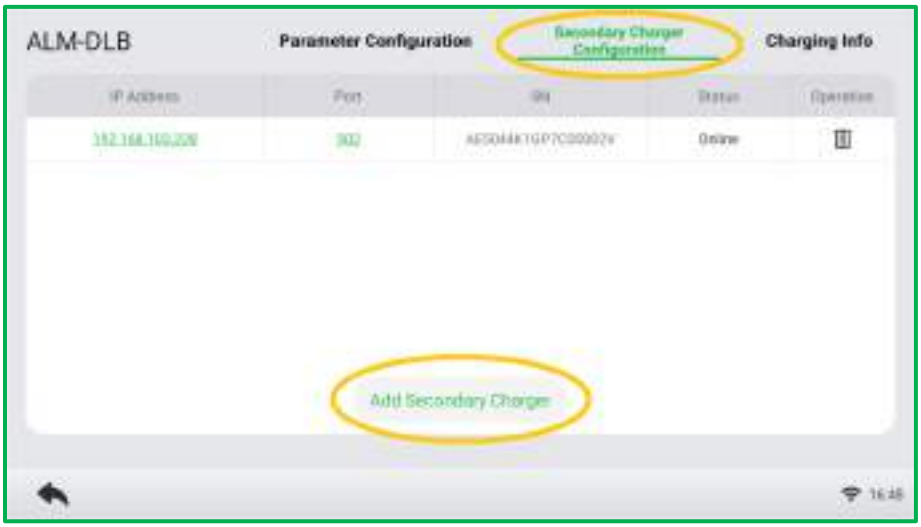
- ✓ **Reserved Power Percentage**: you must enter the power reserve for the charger, namely the reserved power not used for charging.
  - ◆ The range of the power reserve is from 0–50%. The maximum reserved power that can be entered is 50% of the total home power.
  - ◆ The default setting of the power reserve is 10%, which is used for the dynamic power change caused by load switching in and out.

- ✓ **Maximum Charging Power of Charger**: lower than the rated power of the charger.
- ✓ **Charging Power for Offline Meter**: the default charging power for offline meter is 10% of the available power.

  Click on the **Save** button to save the settings.



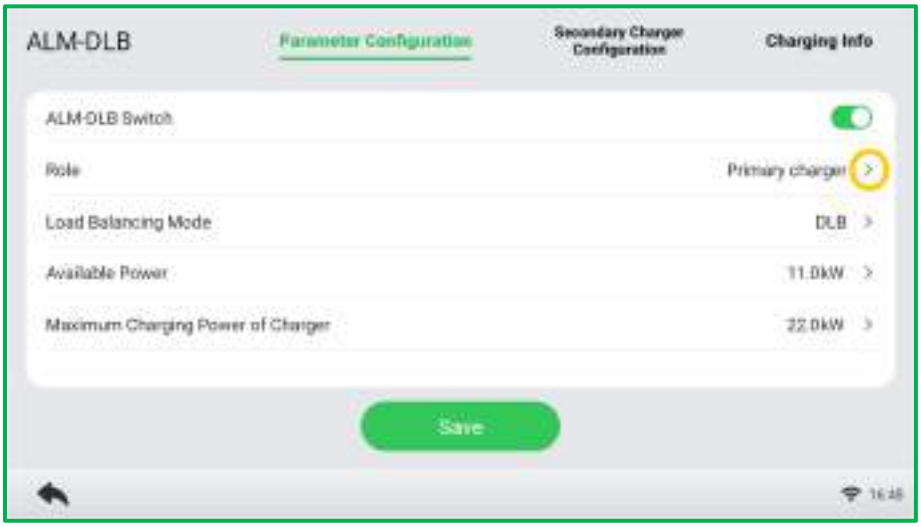
4. **Add secondary charger**. Tap on **Secondary Charger Configuration** and click on **Add Secondary Charger**. Add the secondary charger by inputting the recorded IP address and click on the **Save** button to save the setup.



5. **Confirm configuration.** After all the setups above are completed, tap on **Charging Information** to confirm the configuration of the selected operating mode.

4.3.3 Set up PV Hybrid Mode w/Multiple Chargers

1. **Refer to STEP 1-5 in *4.3.1* to operate.**
2. **Set primary charger.**
   1) Refer to **STEP 1** in *4.2.1* to operate.
   2) Enable **ALM-DLB Switch** as shown below.
   3) Click on "**>**" to the right of the **Role** and select **Primary charger**.



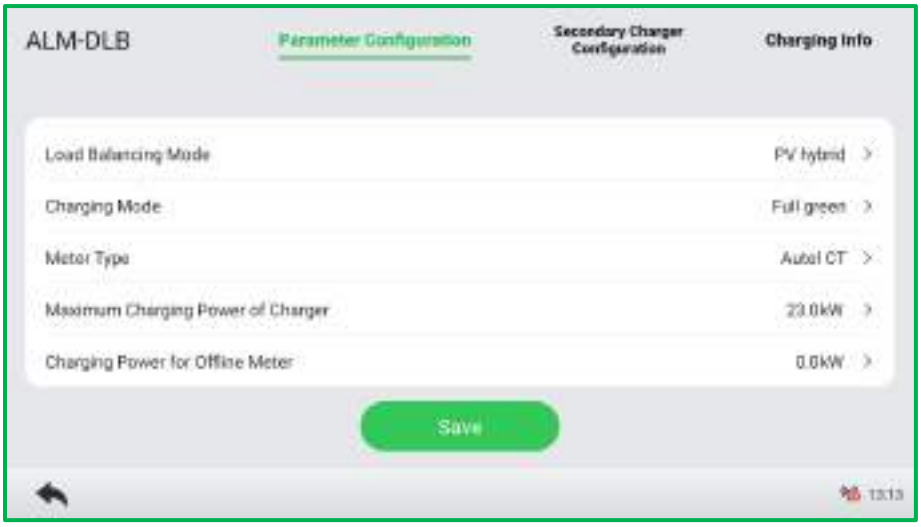
3. **Set up PV Hybrid mode.** Click on "**>**" to the right of the of the **Load Balancing Mode** and select **PV Hybrid**.

There are three charging modes available. The settings vary depending on the charging modes.

a) Full Green Charging Mode

- ✓ **Charging Mode**: Select **Full Green** from the charging mode options.
- ✓ **Meter Type**: Select the meter from the meter type options.
- ✓ **Maximum Charging Power of Charger**: lower than the rated power of the charger.
- ✓ **Charging Power for Offline Meter**: the default charging power for offline meter is 10% of the available power.

Tap **Save** once you have completed the settings.



b) Green Priority Charging Mode

- ✓ **Charging Mode**: Select **Green Priority** from the charging mode options.
- ✓ **Available Power (kW)**: you need to enter the available power that the system can supply to the chargers. You must enter a whole number.

  The value of the available power should be within the following range:
  - ◆ Maximum Value: lower than the upstream MCB/RCBO rated power.
  - ◆ Minimum Value: higher than the minimum power of one charger (1.4 kW for single-phase, 4.2 kW for three-phase) x N (N represents the number of chargers in the device group).

- ✓ **Meter Type**: Select the meter from the meter type options.
- ✓ **Maximum Charging Power of Charger (kW)**: lower than the rated power of the charger.
- ✓ **Minimum Charging Power (kW)**: the sum of the minimum charging power of all chargers.
- ✓ **Charging Power for Offline Meter (kW)**: the default charging power for offline meter is 10% of the available power.

  Tap **Save** once you have completed the settings.

c) Speed Priority Charging Mode

- ✓ **Charging Mode**: Select **Speed Priority** from the charging mode options.
- ✓ **Available Power (kW)**: you need to enter the available power that the system can supply to the chargers. You must enter a whole number.

The value of the available power should be within the following range:

- ◆ Maximum Value: lower than the upstream MCB/RCBO rated power.
- ◆ Minimum Value: higher than the minimum power of one charger (1.4 kW for single-phase, 4.2 kW for three-phase) x N (N represents the number of chargers in the device group).

- ✓ **Meter Type**: Select the meter from the meter type options.
- ✓ **Maximum Charging Power of Charger(kW)**: lower than the rated power of the charger.
- ✓ **Charging Power for Offline Meter (kW)**: the default charging power for offline meter is 10% of the available power.

Tap **Save** once you have completed the settings.

4. **Add secondary charger**. Tap on **Secondary Charger Configuration** and click on **Add Secondary Charger**. Add the secondary charger by inputting the recorded IP address and click on the **Save** button to save the setup.

5. **Confirm configuration.** After all the setups above are completed, tap on **Charging Information** to confirm the configuration of the selected operating mode.

5 Modbus Register

5.1 Read Input Register

The function code is 04(hex04). The Modbus implementation enables to read 1–125 contiguous input registers. Here is an example of request and response:

Request			Response		
Function Code	**1 Byte**	**0x04**	**Function Code**	**1 Byte**	**0x04**
Starting Address	2 Bytes	0x0000 to 0xFFFF	Byte Count	1 Byte	2xN
Quantity of Input Register	2 Bytes	0x0001 to 0x007D	Input Register	N x Bytes	Value

5.2 Read Holding Register

The function code is 03(hex03). The Modbus implementation enables to read 1–125 contiguous holding registers. Here is an example of request and response:

Request			Response		
Function Code	**1 Byte**	**0x03**	**Function Code**	**1 Byte**	**0x03**
Starting Address	2 Bytes	0x0000 to 0xFFFF	Byte Count	1 Byte	2xN
Quantity of Holding Register	2 Bytes	0x0001 to 0x007D	Holding Register	N x Bytes	Value

5.3 Write Single Holding Register

The function code is 06(hex06). The Modbus implementation enables to write only 1 holding register. Here is an example of request and response:

Request			Response		
Function Code	**1 Byte**	**0x06**	**Function Code**	**1 Byte**	**0x06**
Register Address	2 Bytes	0x0000 to 0xFFFF	Register Address	2 Bytes	0x0000 to 0xFFFF
Register Value	2 Bytes	0x0000 to 0xFFFF	Register Value	2 Bytes	0x0000 to 0xFFFF

5.4 Write Multiple Holding Registers

The function code is 16(hex10). The Modbus implementation enables to write multiple holding registers and the data is packed into 2 bytes per register. Here is an example of request and response:

Request			Response		
Function Code	**1 Byte**	**0x10**	**Function Code**	**1 Byte**	**0x10**
Starting Address	2 Bytes	0x0000 to 0xFFFF	Starting Address	1 Byte	0x0000 to 0xFFFF
Quantity of Holding Register	2 Bytes	0x0001 to 0x007B	Quantity of Holding Register	2 Bytes	1 to 123 (0x7B)
Byte Count	1 Byte	2xN			
Register Value	N x 2 Bytes	Value			

5.5 Register Specifications

Modbus Parameters (Holding Register)

Register	Name	Description	Type	Unit
0000	Limit Control Mode	Charging Mode: 0 – Power Mode 1 – Current Mode	UINT16	/
0001	Link Type	Enumeration Value: 0 – RS485 1 – TCP	UINT16	/
0002	Comm Timeout Time	Communication Timeout	UINT16	Second
0003	Slave ID	Slave address, 1/bit Default: 1	UINT16	/
0004	Slave ID Confirm	Slave address modification confirm, 1/bit Default: 1	UINT16	/

NOTE
To change the slave ID, start by setting the register 0003, followed by setting the register 0004, ensuring the input data remains consistent.

Read-only Register (Input Register) Address 0100~1999

Register + Offset	Name	Description	Type	Unit
1000x	State	Charging state 0 – Available 1 – Preparing _Tagld _Ready 2 – Preparing _EV _Ready 3 – Charging 4 – Suspended EV 5 – Suspended EVSE 6 – Finishing 7 – Reserved 8 – Unavailable 9 – Unavailable FW Update 10 – Faulted 11 – Unavailable Connection Object	UINT16	/
1100x	Charging Voltage	Current charging voltage *Available for DC charging connector	UINT32	0.01 V
1200x	Charging Current	Current charging current *Available for DC charging connector	UINT32	0.01 A
1300x	Charging Power	Current charging power *Available for DC charging connector	UINT32	1
1400x	Charge Time	Time from charging start	UINT16	Sec
1500x	Charged Energy	Charged energy of current charging session	UINT16	KWh/100

NOTE
For the State item in the above table, when Connector ID is 0, only Available, Unavailable, and Faulted can be set.

Read and Write Register (Holding Register) Address 1600~1999

Register + Offset	Name	Description	Type	Unit
1600x	Power Limit Value	Limit value of charging power	UINT32	W
1700x	Current Limit Value	Limit value of charging current	UINT32	0.01 A
1800x	Offline Power Value	Limit value of offline power	UINT32	W
1900x	Offline Current Value	Limit current of offline current	UINT32	0.01 A

The offset “x” marked in red above is ruled as follows:

Offset	Description
0	Charger, 0# Connector
4	1# Connector
8	2# Connector
12	3# Connector
16	4# Connector
20	5# Connector
24	6# Connector
28	7# Connector
32	#8 Connector

Read-only Register (Input Register) Address 10000~18999

Register + Offset	Name	Description	Type	Unit
1y000	State	Charging state 0 – Available 1 – Preparing _TagId _Ready 2 – Preparing _EV _Ready 3 – Charging 4 – Suspended EV 5 – Suspended EVSE 6 – Finishing 7 – Reserved 8 – Unavailable 9 – Unavailable FW Update 10 – Faulted 11 – Unavailable Connection Object	UINT16	/
1y001	Charging Voltage	Current charging voltage *Available for DC charging connector	UINT32	0.01 V
1y003	Charging Current	Current charging current *Available for DC charging connector	UINT32	0.01 A
1y005	Charging Power	Current charging power *Available for DC charging connector	UINT32	1 W
1y007	Charge Time	Time from charging start	UINT16	Sec
1y008	Charged Energy	Charged energy of current charging session	UINT16	KWh/100
1y009	L1 Voltage	Current charging voltage of L1 line *Available for AC charging connector	UINT32	0.01 V

Register + Offset	Name	Description	Type	Unit
1y011	L2 Voltage	Current charging voltage of L2 line *Available for AC charging connector	UINT32	0.01 V
1y013	L3 Voltage	Current charging voltage of L3 line *Available for AC charging connector	UINT32	0.01 V
1y015	L1 Current	Current charging current of L1 line *Available for AC charging connector	UINT32	0.01 A
1y017	L2 Current	Current charging current of L2 line *Available for AC charging connector	UINT32	0.01 A
1y019	L3 Current	Current charging current of L3 line *Available for AC charging connector	UINT32	0.01 A
1y021	L1 Power	Current charging power of L1 line *Available for AC charging connector	UINT32	1 W
1y023	L2 Power	Current charging power of L2 line *Available for AC charging connector	UINT32	1 W
1y025	L3 Power	Current charging power of L3 line *Available for AC charging connector	UINT32	1 W
1y100	SN	SN of charger	ASCII	32 bytes (Big-Endian)

NOTE

1. The “y” marked in red above means the connector ID.
2. For the State item in the above table, when Connector ID is 0, only Available, Unavailable, and Faulted can be set.

Read and Write Register (Holding Register) Address 20000~28999

Register	Name	Description	Type	Unit
2y000	Power Limit Value	Limit value of charging power	UINT32	W
2y002	Current Limit Value	Limit value of charging current	UINT32	0.01 A
2y004	Offline Power Value	Limit value of offline power	UINT32	W
2y006	Offline Current Value	Limit current of offline current	UINT32	0.01 A

NOTE

The “y” marked in red above means the connector ID.

The connector ID and its meanings are as follows:

Connector ID	Description
0	Charger, 0# Connector
1	1# Connector
2	2# Connector
3	3# Connector
4	4# Connector
5	5# Connector
6	6# Connector
7	7# Connector
8	#8 Connector

6 Energy Management Strategies

Autel energy management system solution is developed through repeated configuration and verification. Below are the Autel energy management system strategies.

DLB Mode

- Reserved Power = Minimum Charging Power (Single-phase:1.4 kW, Three-phase:4.2 kW)
- Allocated Power for Each Offline Charger = Maximum Power Configured in DLB Setting / Number of Chargers Configured in the DLB System
- Offline Power = Allocated Power for Each Offline Charger x Number of Offline Chargers
- Allocated Power for Each Remaining Online Charger in Charging = (Maximum Power Configured in DLB Setting - Reserved Power - Offline Power) / Number of Online Chargers in Charging

NOTE
When all chargers are online and charging, the reserved power is 0.

ALM Mode

- Allocable Power = Maximum Power Configured in ALM Setting x (1 - 5% - Reserved Power Percentage in the Charging Station in ALM Setting)
- Offline Power = Minimum Charging Power for Charger x Number of Offline Chargers
- Allocated Power for Each Online Charger in Charging = (Allocable Power – Household Loads – Offline Power) / Number of Online Chargers in Charging
- Allocated Power for Each Offline Charger = Minimum Charging Power for Charger

NOTE
1. If the calculated online allocated power is lower than the minimum charging power, the last activated charger will pause charging and will resume charging when the online chargers can be charged using the minimum charging power.
2. If the meter is abnormal, all chargers will pause charging.

Minimum Power

a) When using a single-phase power supply, the minimum power is 1.4 kW.

b) When using a three-phase power supply, the minimum power is 4.2 kW.

PV Hybrid Mode

- **Full Green Charging Mode**

  Allocated Power = Solar Energy – Household Loads

- **Green Priority Charging Mode**

  a) **When Solar Energy > Household Loads + Minimum Charging Power for Charger**

  Allocated Power = Solar Energy – Household Loads

  b) **When Solar Energy ≤ Household Loads + Minimum Charging Power for Charger**

  Allocated Power = Minimum Charging Power for Charger

- **Speed Priority Charging Mode**

  Allocated Power = Solar Energy + Available Energy – Household Loads

AUTEL