Export Power Control Solution

Energy communication unit ECU-C&ECU-R

(For APAC)

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Tip: APsystems has adapted the following meters, which must be supplied by APsystems; otherwise, self-purchased meters will not be compatible.

Part1: ECU-C's Export Power Control

1.ECU-C Meter Function

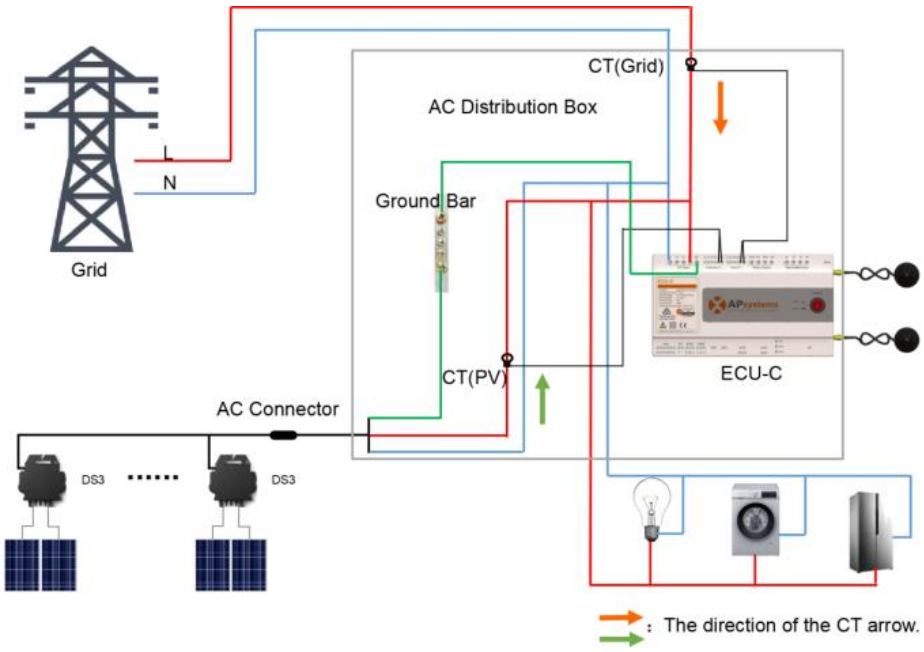
Export Limit Function: After turning on the Export Limit Function function, if the power limit value is not filled, the default is 0, that is, when the ECU-C detects that the power generated by the photovoltaic system is uploaded to the grid (reverse power), it immediately sends a command to reduce the output power of the inverter to eliminate reverse power, when the forward power flowing from the grid to the load increases, the inverter output power increases again to dynamically adjust, which can not only achieve the anti-backflow function, but also maximize the use of solar energy.

Power to the grid limit: Limiting the reverse power value, such as input 3, represents the upper limit of the reverse power uploaded to the grid by the ECU through the control system power generation power limit is 3KW, and the default value is 0 by default, which is the 0-export function.

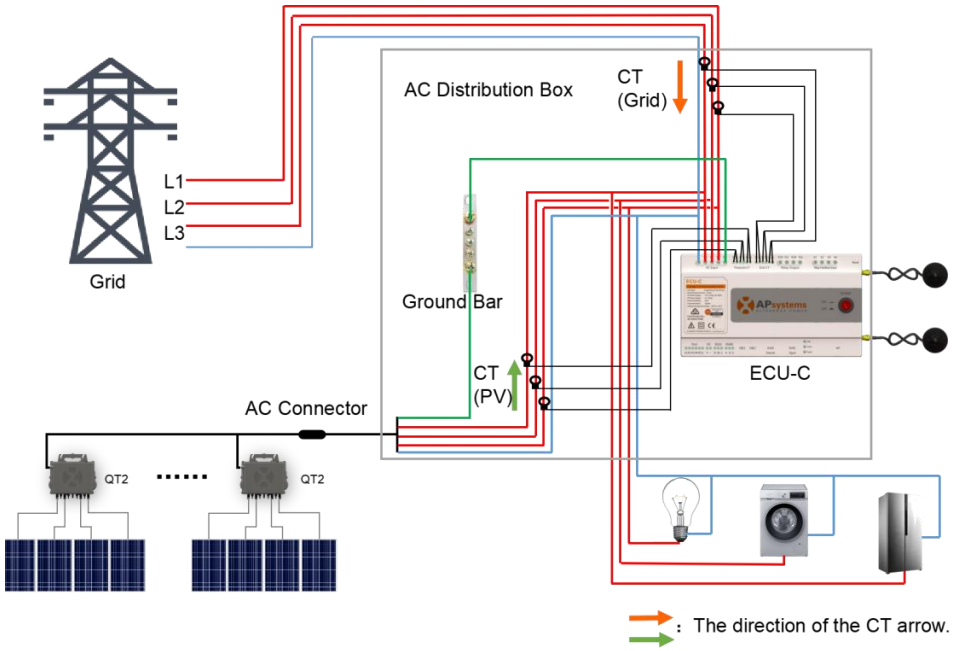
Three-phase configuration: If a three-phase system composed of APsystems's single-phase micro-inverters needs to realize the function of independent anti-backflow of each phase or limit the grid power, it is necessary to register the micro-inverters connected to each phase separately in the corresponding boxes.

1.1 Export Limit Function

1.1.1 Single-phase Export Limit (System wiring diagram)



1.1.2 Three-phase Export Limit (System wiring diagram)

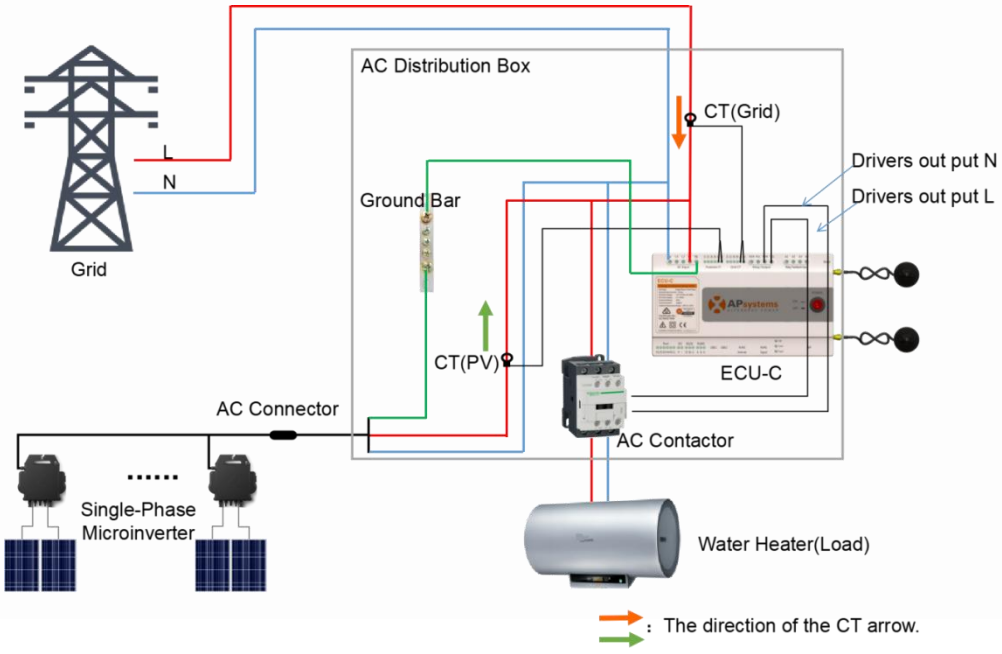


1.2 Relay Control

This function is to control the opening of the external AC contactor by closing the ECU-C relay when the power of the uploaded power grid reaches a certain power value, so as to supply power to external electrical equipment (such as a water heater),try to consume the electrical energy uploaded to the grid at the local load.

Threshold: It indicates that when the power of the uploaded power grid reaches this value, the relay is closed, and the external contactor is controlled to conduct. For example, the power of the water heater is 2KW, and the turn-on threshold can be set to 2KW, so that when the upload grid power exceeds 2KW, the water heater is powered by the relay control and does not consume grid power.

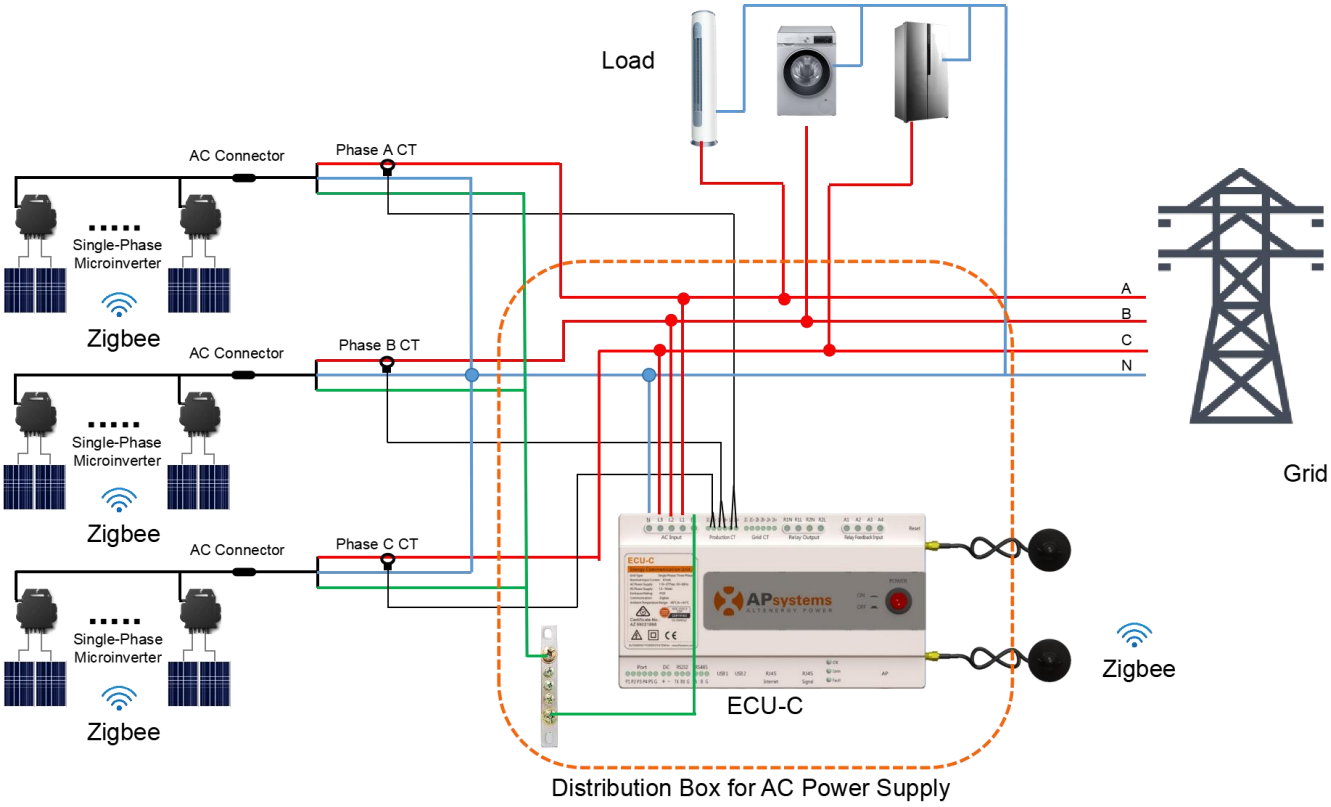
Note: This function is currently only applicable to single-phase systems.Once the microinverter's output power hits the preset threshold, the relay closes and remains latched for a minimum of 300 seconds before any state transition is permitted.



1.3 Three phase Balance

When using APsystems single-phase micro-inverse to form a three-phasesvstem, the three-phase balance function can be turned on to ensure that the three-phase currenidifference does not exceed 16A.

The three-phase balance function can be connected to the detection current throuah an externai, and the response speed is faster'it can also be collected by the ECU to collect micro-inyersedata on each phase for detection. At this time, no external CT is reguired. but the response speecwill be slow, and the general maximum duration is 5 minutes.And at this function, you need to reister separately according to the micro-inverse serial numbelof each phase in the three-phase configuration.



2.ECU-C Meter Setting

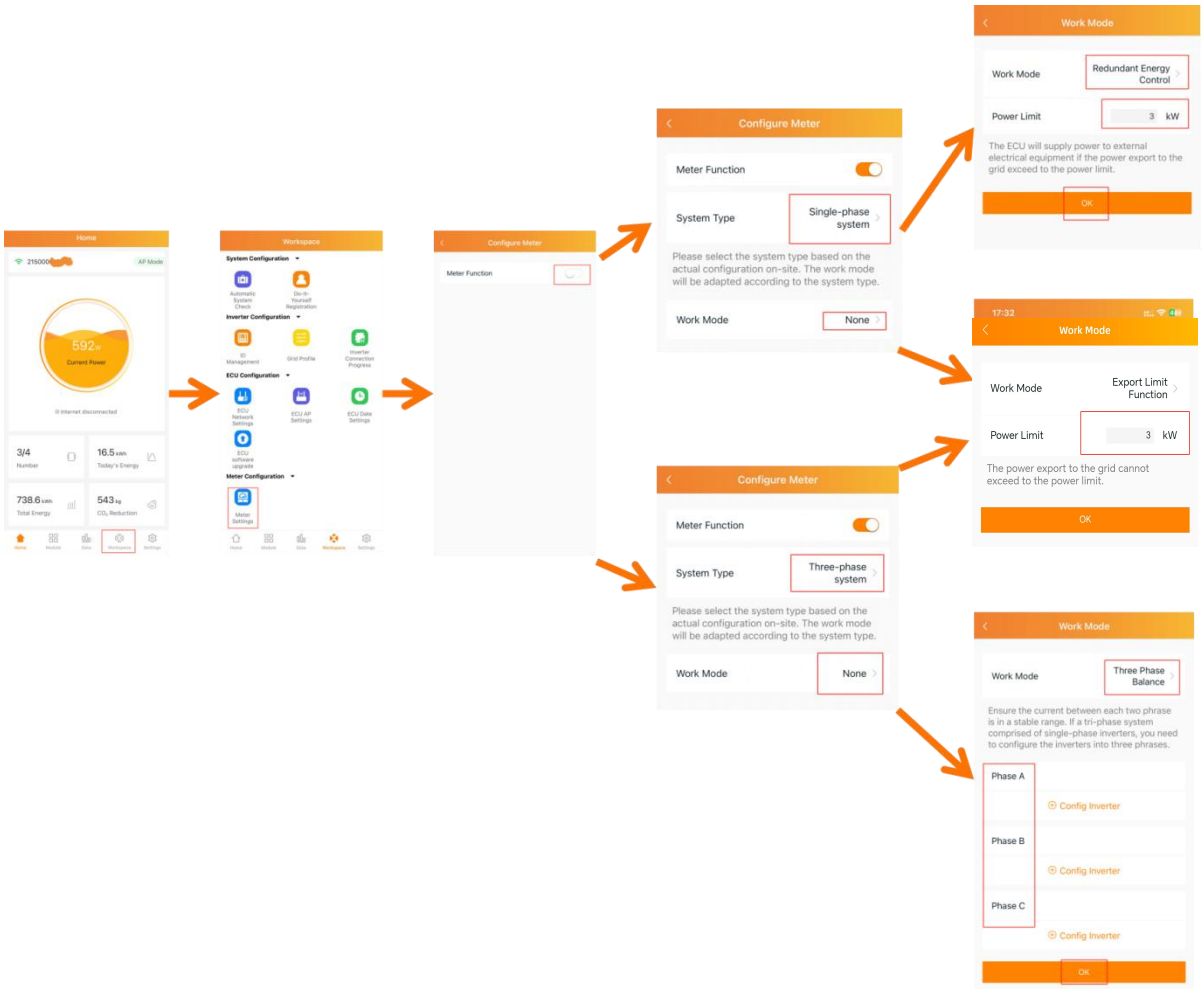
2.1 Electric Meter Configuration on APP (Local access)

The functions of the electricity meter include three types:

1. Export Limit Function 2. Relay Control 3. Three Phase Balance

When choosing "Single-Phase System" (where all the micro-inverters must be APsystems' single-phase microinverters), according to actual requirements, select either "Export Limit Function" or "Relay Control" working modes.
When choosing "Three-Phase System" (where all the microinverters must be APsystems' three-phase microinverters), the "Export Limit Function" working mode can be used.

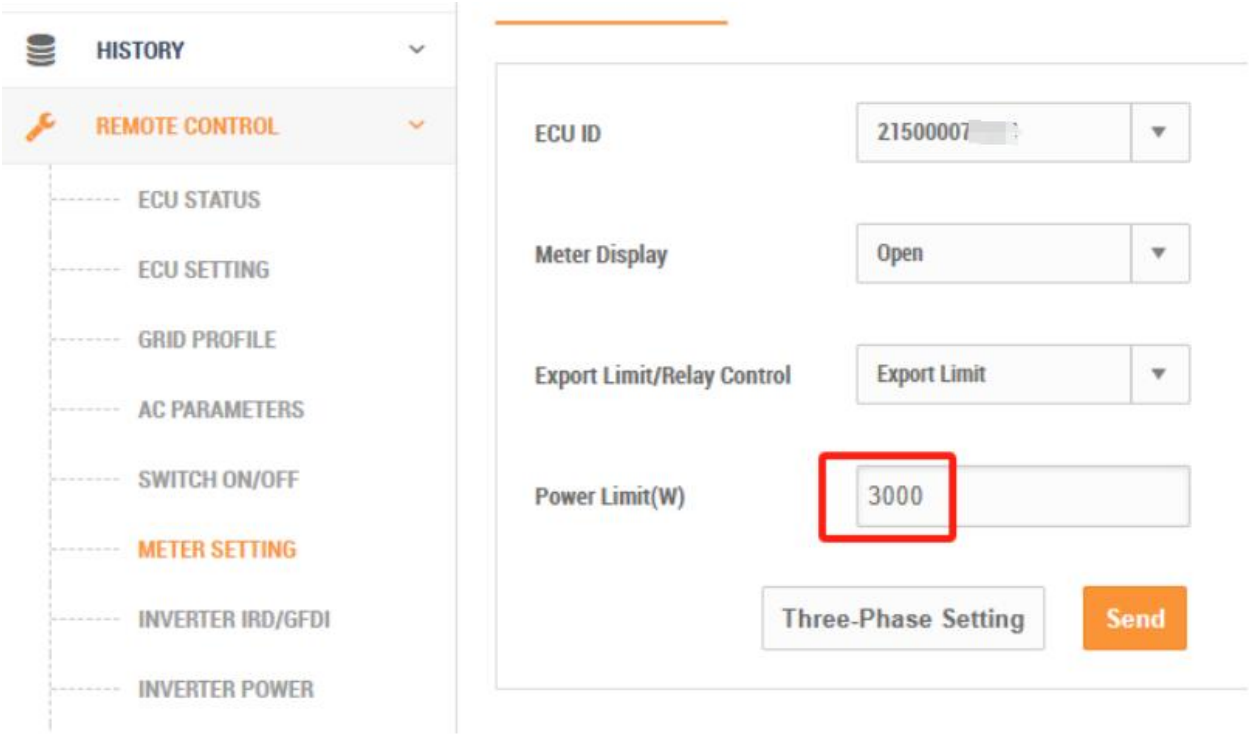
When the microinverters are Single-Phase microinverters and connected to a three-phase power grid, and a three-phase balance state is simultaneously achieved, the "Three-Phase Balance" working mode can be used (to ensure that the current between the three phases does not exceed 16A.)



2.2 Electric Meter Configuration on EMA Web(Remote Control)

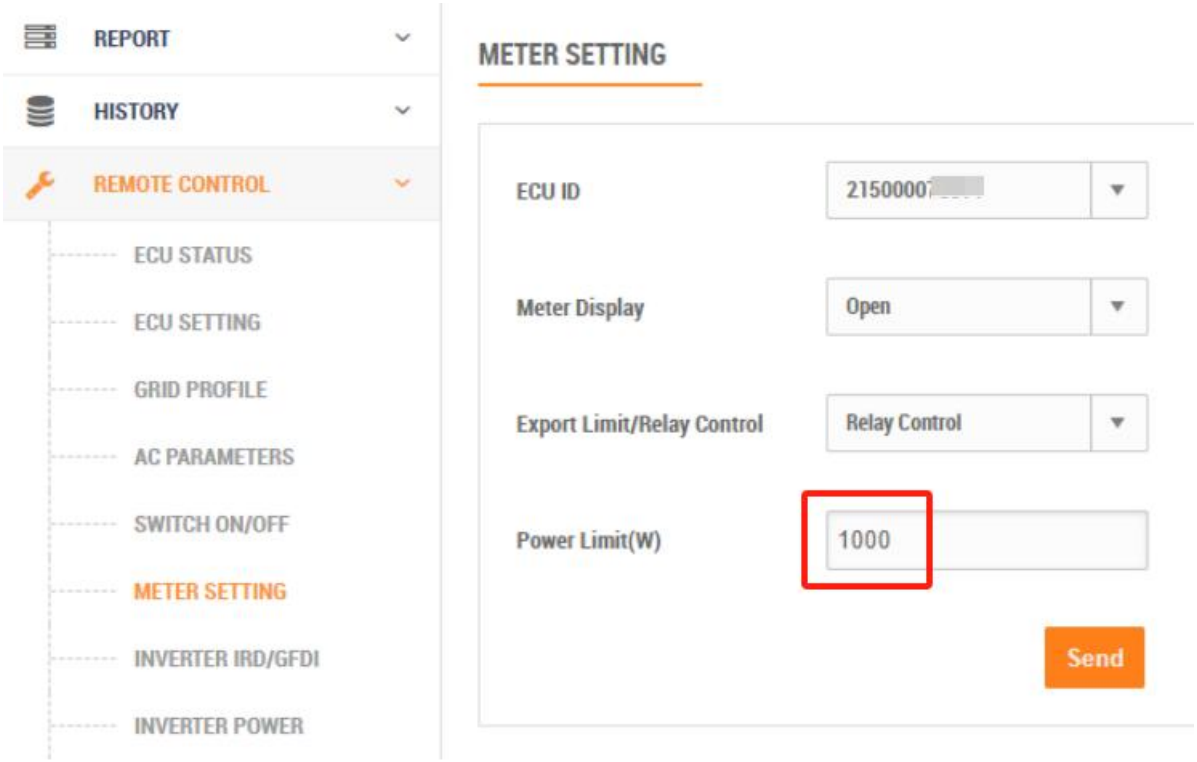
2.2.1. Export Limit Function

Enable "Export Limit" and set the reverse current allowance value. For example,the value set in the figure is 3000W for the reverse current allowance per phase.



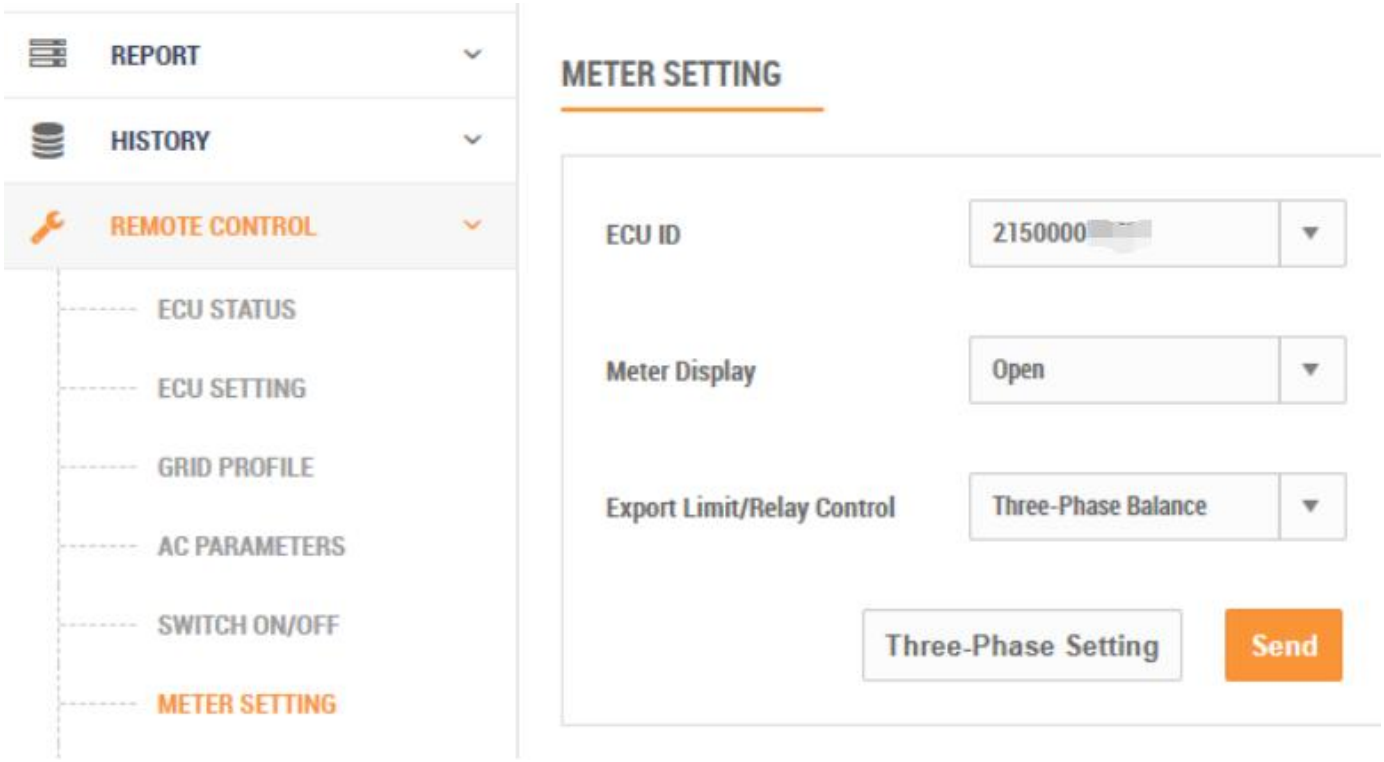
2.2.2.Relay Control

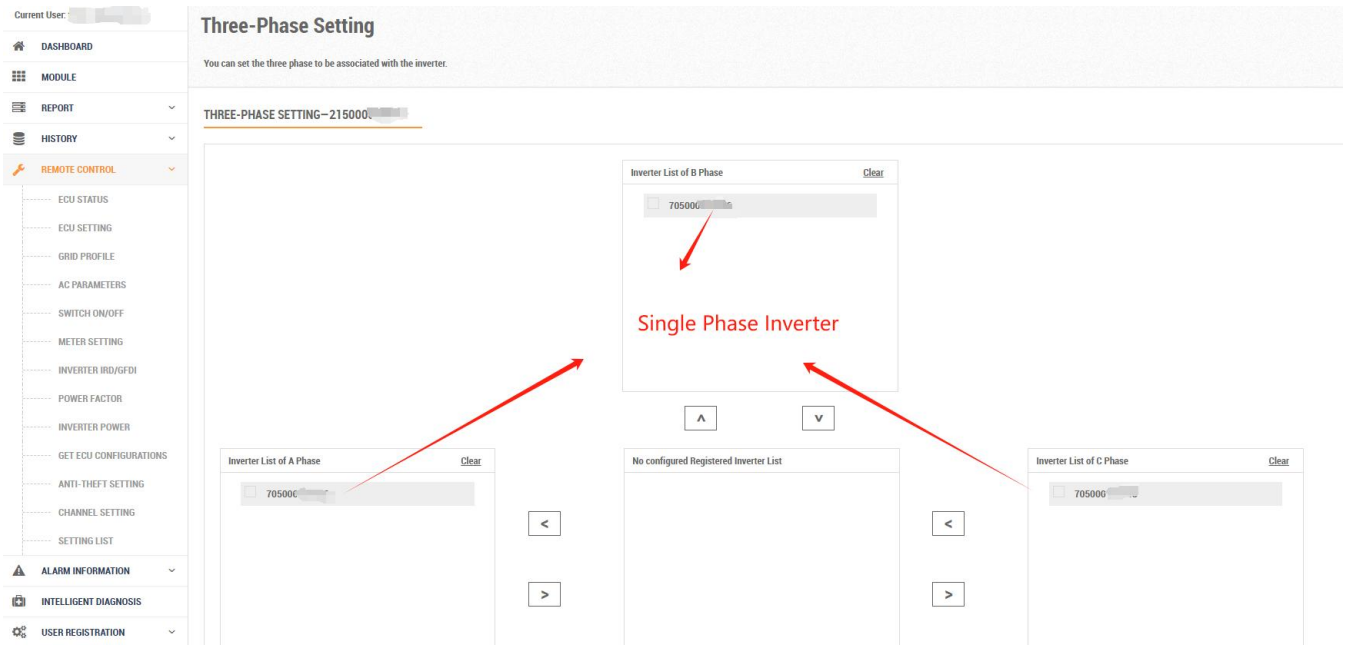
When the uploaded power to grid reaches the set value, it will be preferentially consumed by the load. This is only applicable to single-phase systems.



2.2.3.Three-Phase Balance

Ensure the current between each two phase is in a stable range. If a tri-phase system comprised of single-phase inverters, you need to configure the inverters into three phases.





2.3 Energy Analysis (EMA Web)

The figure shows: the amount of electricity generated by photovoltaic power on that day, the electricity consumed by users, the electricity fed into the grid, and the electricity purchased.

Part2: ECU-R&Chint Meter Export Limit Control

(Applicable scenarios: Add Meter to ECU-R to realize the function of electricity meter.)

Tip: APsystems has adapted the following meters, which must be supplied by APsystems; otherwise, self-purchased meters will not be compatible.

1.Single-Phase Meter

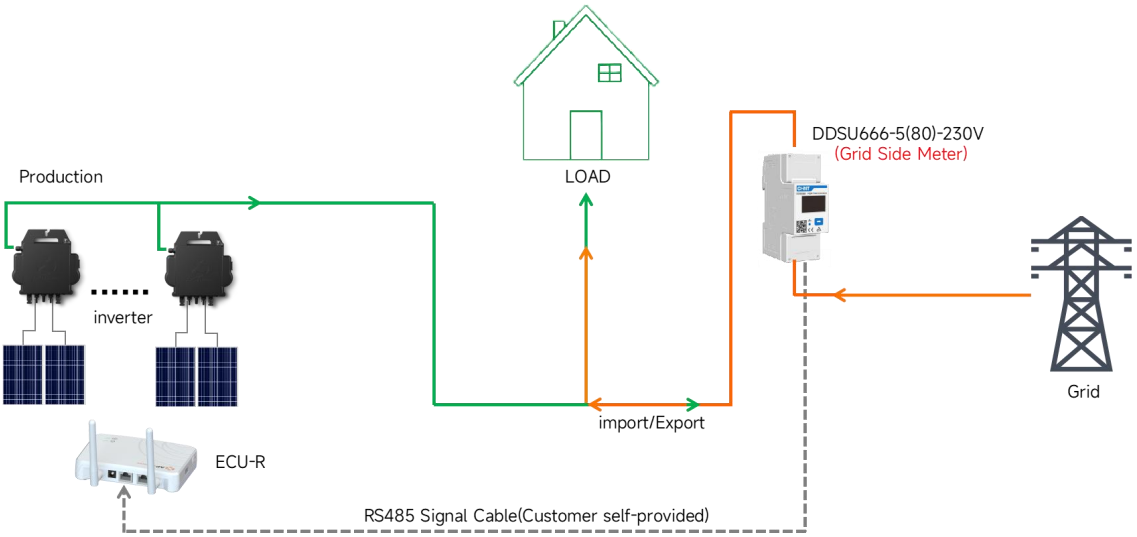
1.1 ECU-R&DDSU666-5(80)-230V

(Total current in the load or PV system less than 80A)

1.1.1 Schematic diagram of the system principle

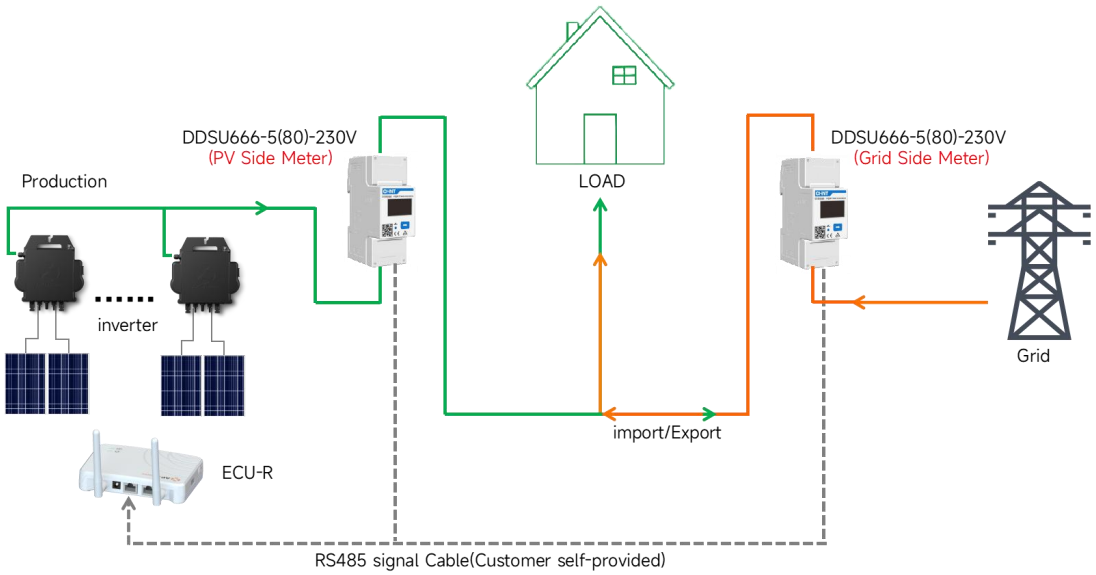
① One Meter:

It is installed on the grid side already enables **Export Limit Function.(Used to capture feed-in and bought-in electricity)**



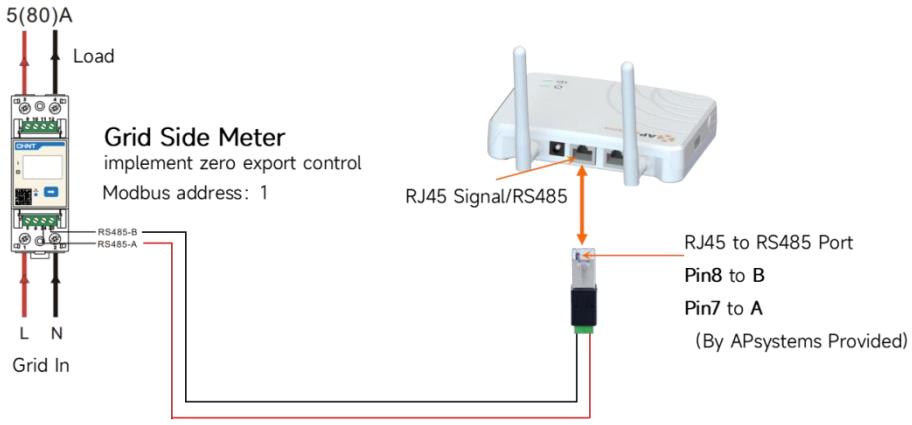
② Two Meters:

PV Side Meter:can only collect photovoltaic data**; GRID Side Meter:**Acts as Export Limit Function.**(For capturing feed-in power, purchased power, PV generation, and customer consumption.)**

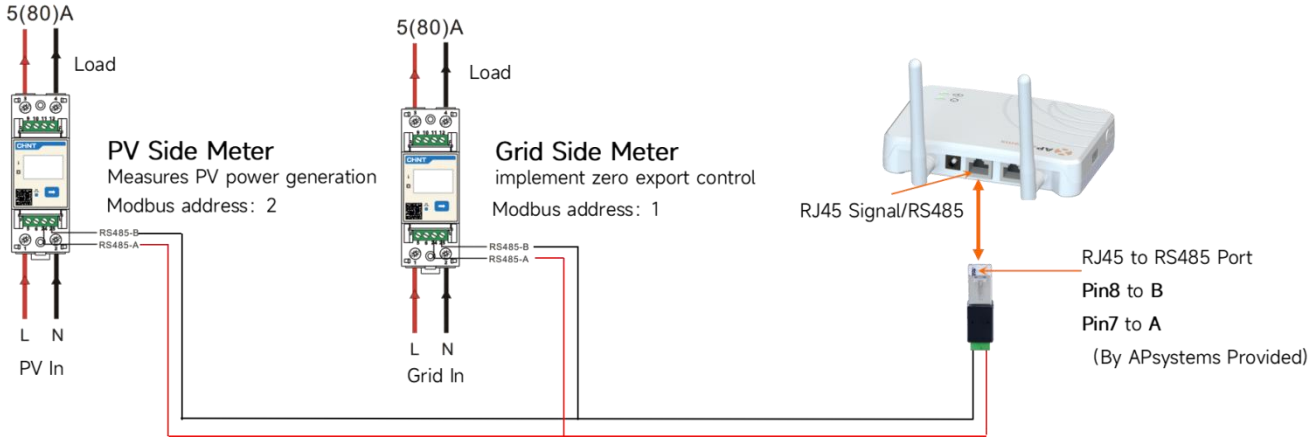


1.1.2 Meter Wiring Diagram

Installation method for one meter:



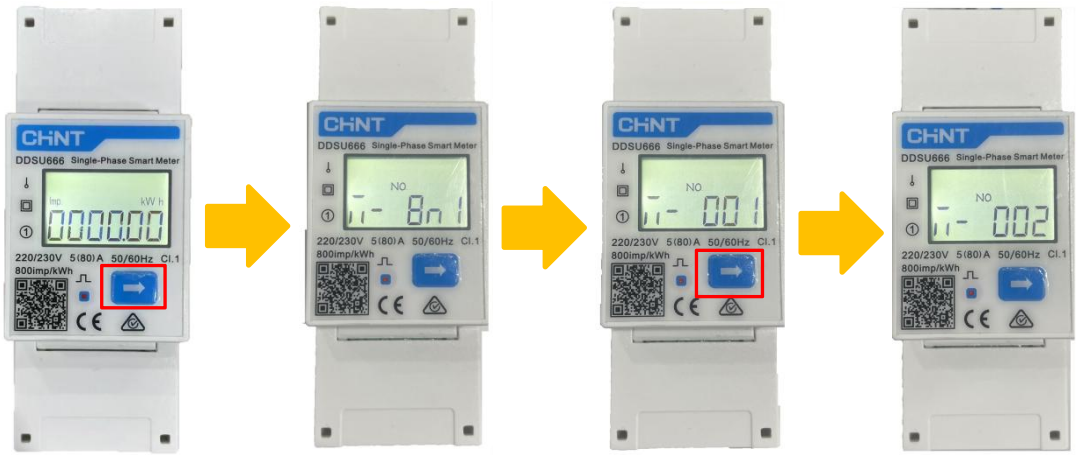
Installation method for Two meters:



Tips:

- RS485 Signal Cable It is recommended to use 0.5mm^2 shielded twisted pair cable or 0.5mm^2 copper cable.
- Use **DDSU666-5(80)-230V** load total current not to exceed 80A.
- PV Side Meter and Grid Side Meter can realize the function independently. According to the number of meters selected for the actual functional requirements, the factory default Modbus address of each meter is 1. If you need to modify the Modbus of the PV Side Meter to 2, you need to modify it manually .The operation process is as follows:

1.Long press the "→" key for 3 to 5 seconds. When "8n1" appears, release it.
2.Wait for the interface to automatically jump to "001", then press "→" once again, and it will become "002".
3.Wait for the automatic jump to the home page.



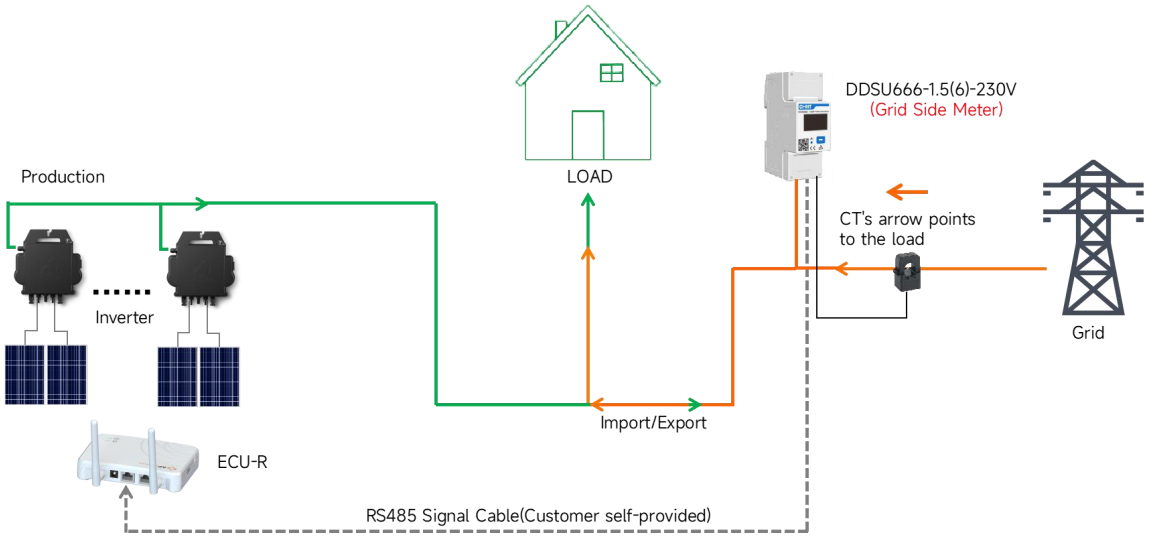
1.2 ECU-R&DDSU666-CT-1.5(6)A-230V

(There is no current limitation, but CT needs to be purchased by yourself, and the CT ratio is less than 9999，The secondary current of CT can only be 1A or 5A.)

1.2.1 Schematic diagram of the system principle

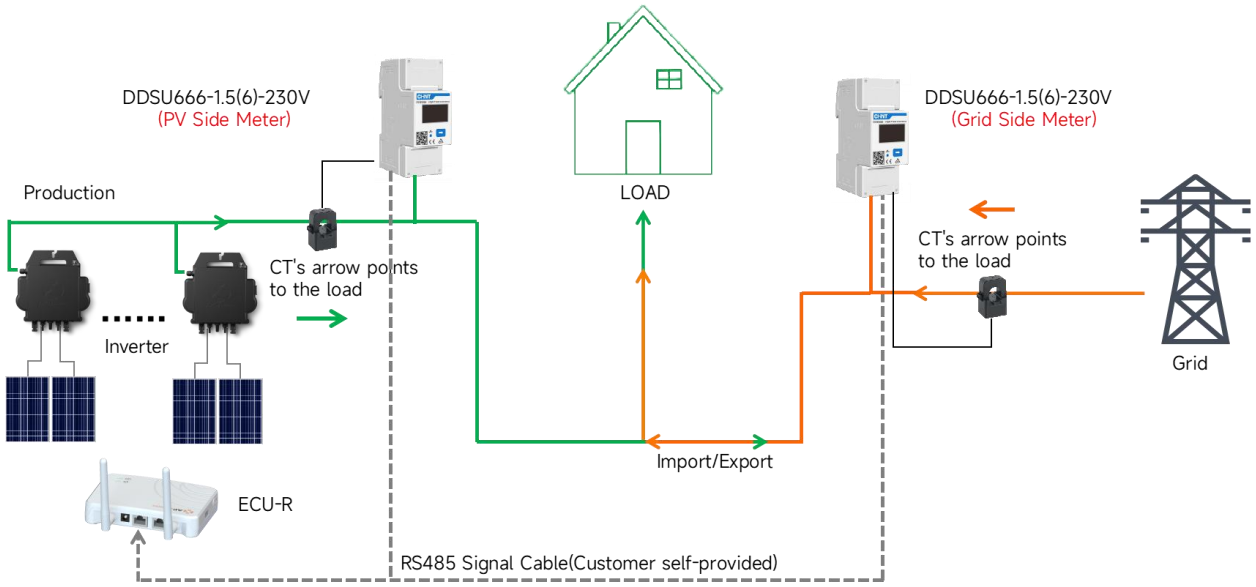
① One Meter:

It is installed on the grid side already enables **Export Limit Function.(Used to capture feed-in and bought-in electricity)**



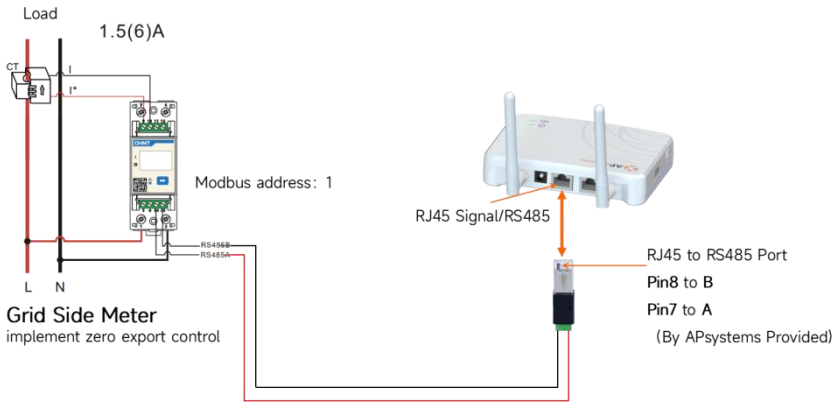
② Two Meters:

PV Side Meter:can only collect photovoltaic data**; GRID Side Meter:**Acts as Export Limit Function.**(For capturing feed-in power, purchased power, PV generation, and customer consumption.)**

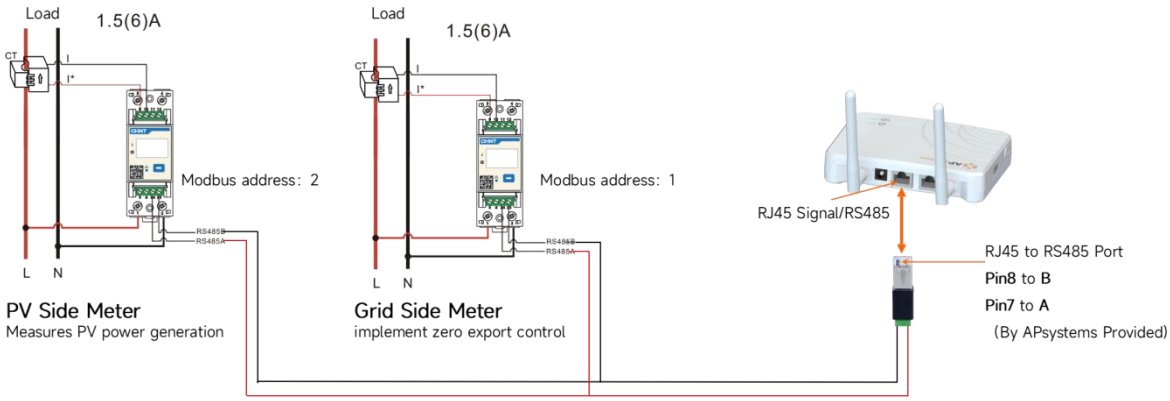


1.2.2Meter Wiring Diagram

➢ Installation method for one meter:



➢ Installation method for Two meters:



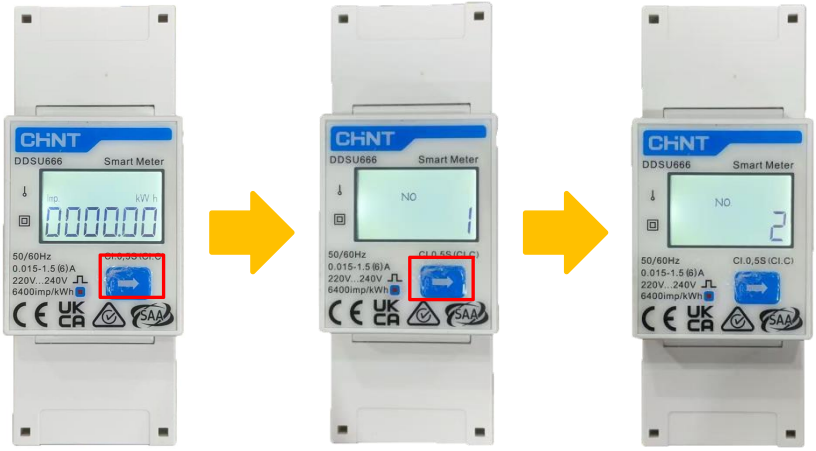
Tips:

➢ RS485 Signal Cable It is recommended to use 0.5mm^2 shielded twisted pair cable or 0.5mm^2 copper cable.

➢ **DDSU666-1.5(6)-230V** CT needs to be prepared by the customer, the secondary side current of CT must be 1A or 5A, the formula of current ratio = primary side current/secondary side current, for example: CT is 200/5A, current ratio = 40.

➢ PV Side Meter and Grid Side Meter can realize the function independently. According to the number of meters selected for the actual functional requirements, the factory default Modbus address of each meter is 1. If you need to modify the Modbus of the PV Side Meter to 2, you need to modify it manually .The operation process is as follows:

Long press the "→" key for 3 to 5 seconds. When "1" appears, release it.Then press "→" once again, and it will become "2".Wait for the automatic jump to the home page.



2. Three Phase-Four Wire Meter

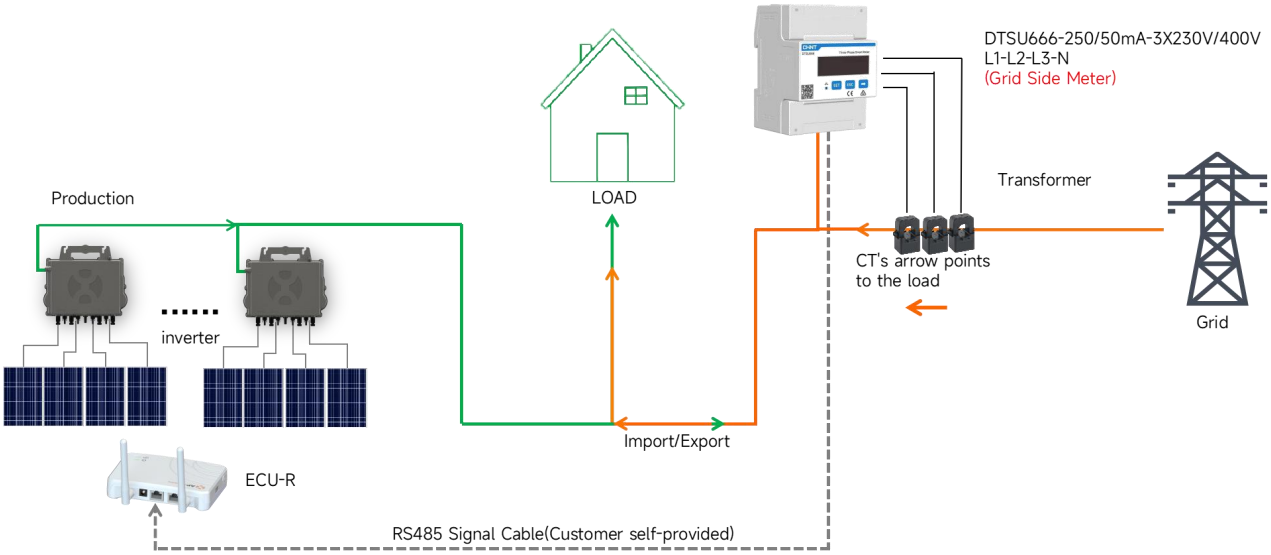
2.1 ECU-R&DTSU666-250A/50mA-3×230V400V

(Total current in the load or PV system less than 250A)

2.1.1 Schematic diagram of the system principle

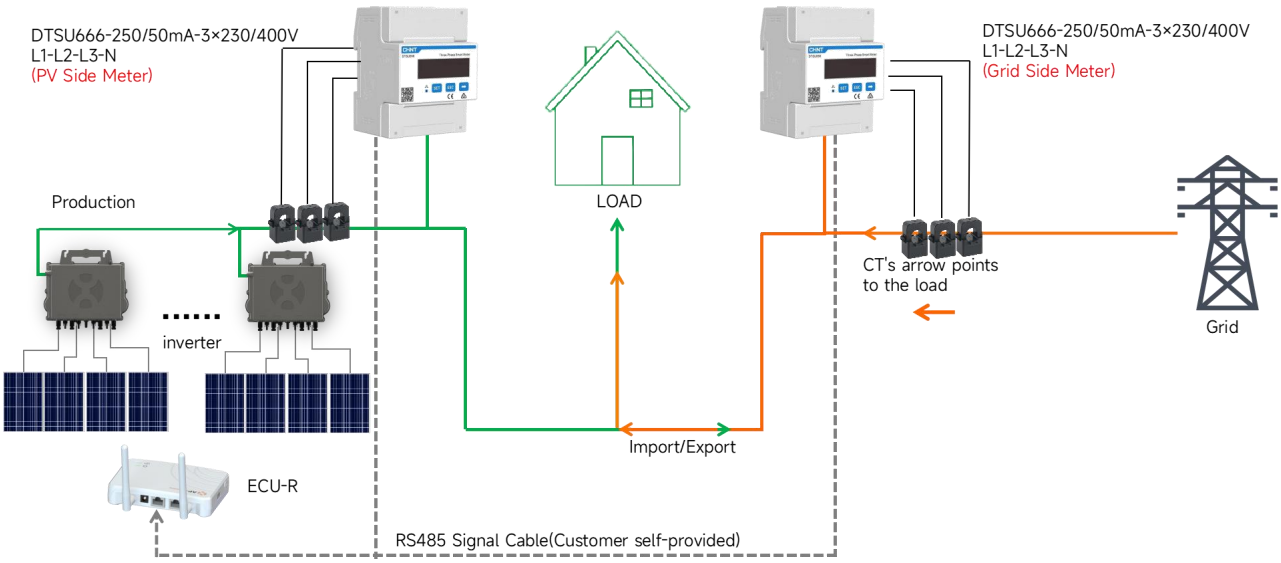
① One Meter:

➢ It is installed on the grid side already enables **Export Limit Function.**



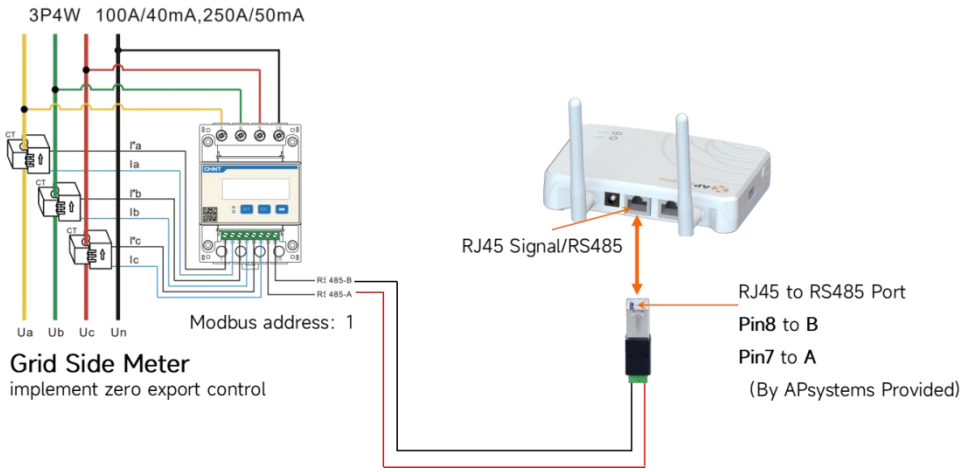
② Two Meters:

PV Side Meter: can only collect photovoltaic data **GRID Side Meter:** Acts as Export Limit Function.(For capturing feed-in power, purchased power, PV generation, and customer consumption.)

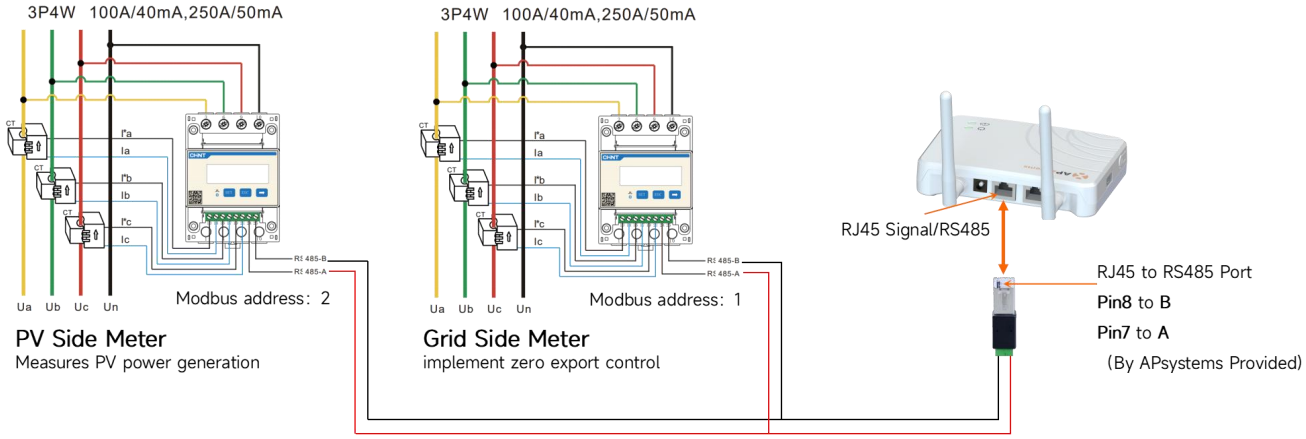


2.1.2 Meter Wiring Diagram

Installation method for one meter:

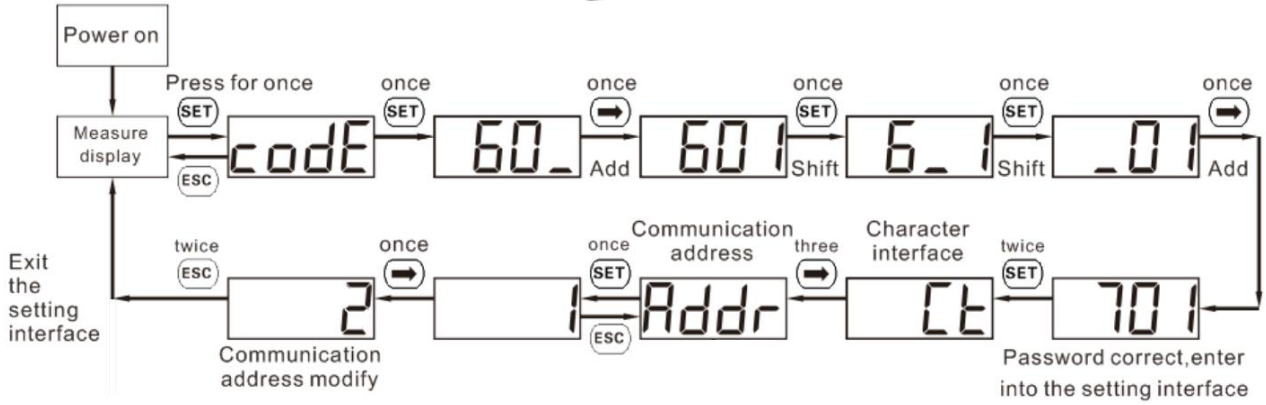


Installation method for Two meters:



Tips:

- RS485 Signal Cable It is recommended to use 0.5mm^2 shielded twisted pair cable or 0.5mm^2 copper cable.
- PV Side Meter and Grid Side Meter can realize the function independently. According to the number of meters selected for the actual functional requirements, the factory default Modbus address of each meter is 1. If you need to modify the Modbus of the PV Side Meter to 2, you need to modify it manually .The operation process is as follows:



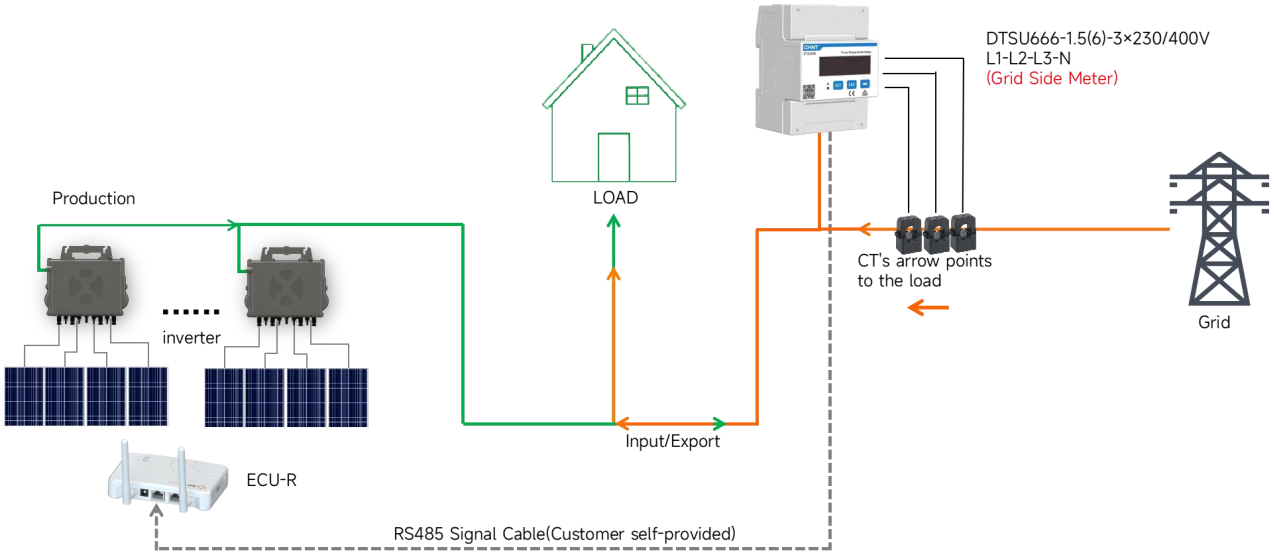
2.2 ECU-R&DTSU666-1.5(6)-3×230/400V

(No current limitation, but CT needs to be purchased by yourself, and the CT ratio is less than 9999， The secondary current of CT can only be 1A or 5A.)

2.2.1 Schematic diagram of the system principle

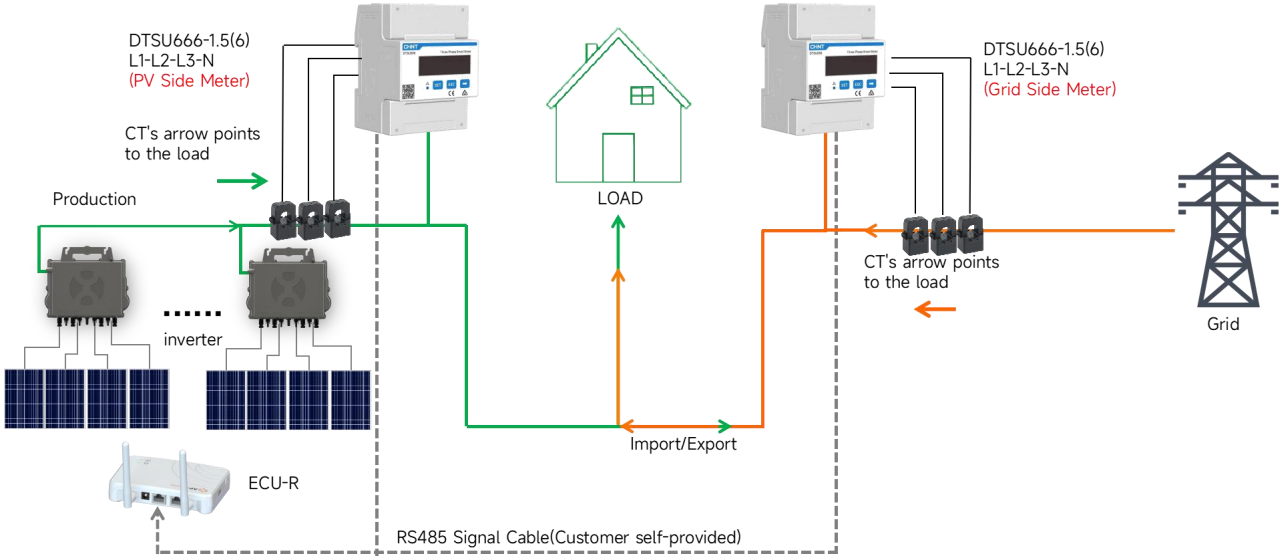
① One Meter

It is installed on the grid side already enables **Export Limit Function.**



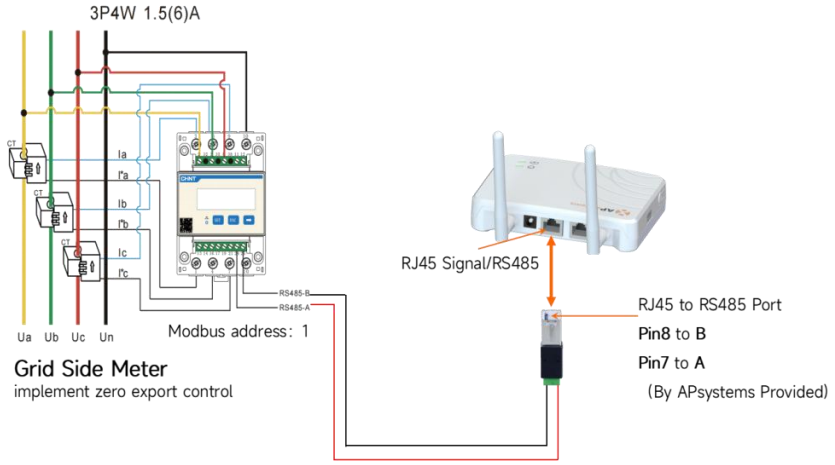
② Two Meters

PV Side Meter:can only collect photovoltaic data**; GRID Side Meter:**Acts as Export Limit Function.(For capturing feed-in power, purchased power, PV generation, and customer consumption.)

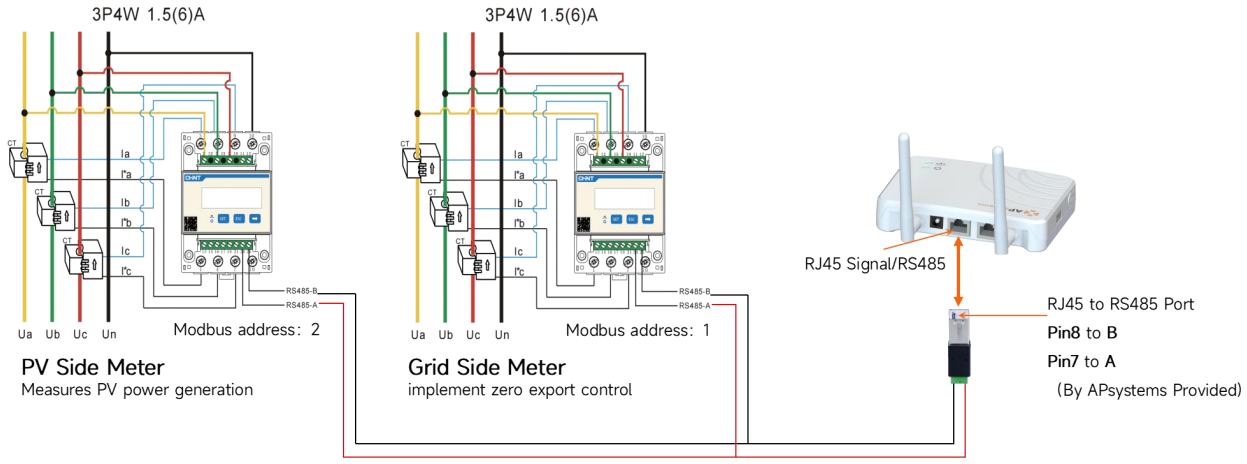


2.2.2 Meter Wiring Diagram

Installation method for one meter:

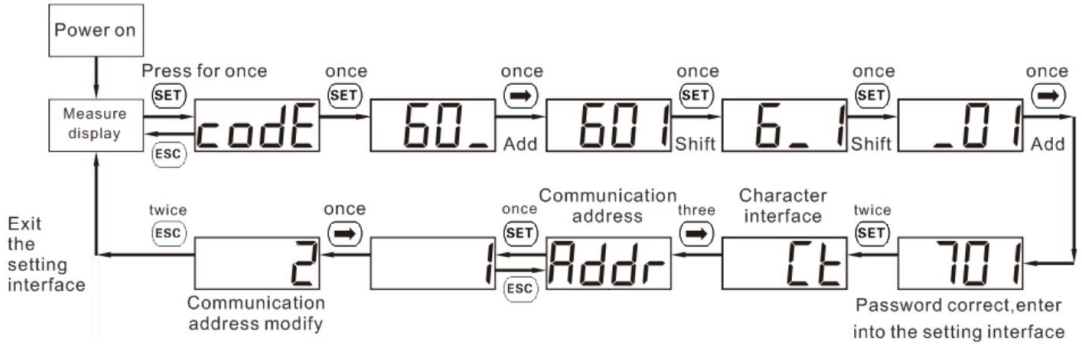


Installation method for Two meters:



Tips:

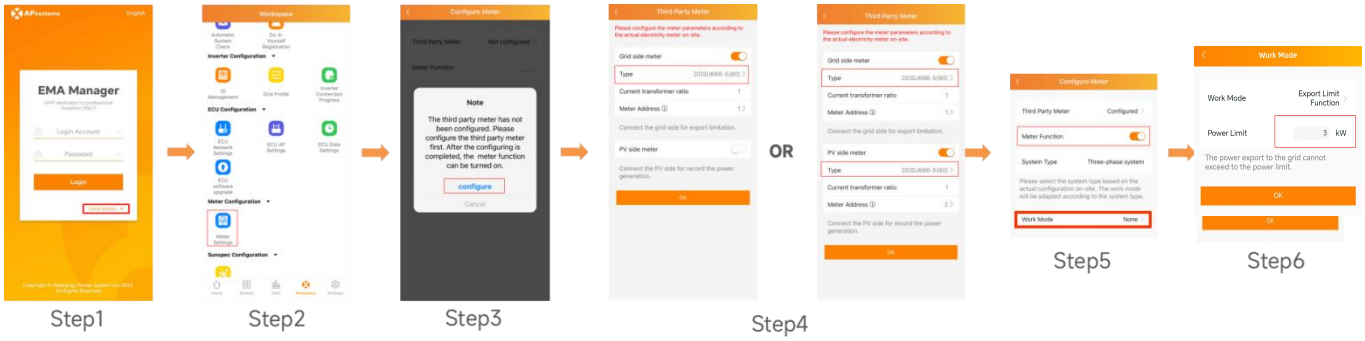
- RS485 Signal Cable It is recommended to use 0.5mm^2 shielded twisted pair cable or 0.5mm^2 copper cable.
- **DTSU666-1.5(6)-230/400V** CT needs to be prepared by the customer, the secondary side current of CT must be 1A or 5A, the formula of current ratio = primary side current /secondary side current, for example: CT is 200/5A, current ratio = 40.
- PV Side Meter and Grid Side Meter can realize the function independently. According to the number of meters selected for the actual functional requirements, the factory default Modbus address of each meter is 1. If you need to modify the Modbus of the PV Side Meter to 2, you need to modify it manually.The operation process is as follows:



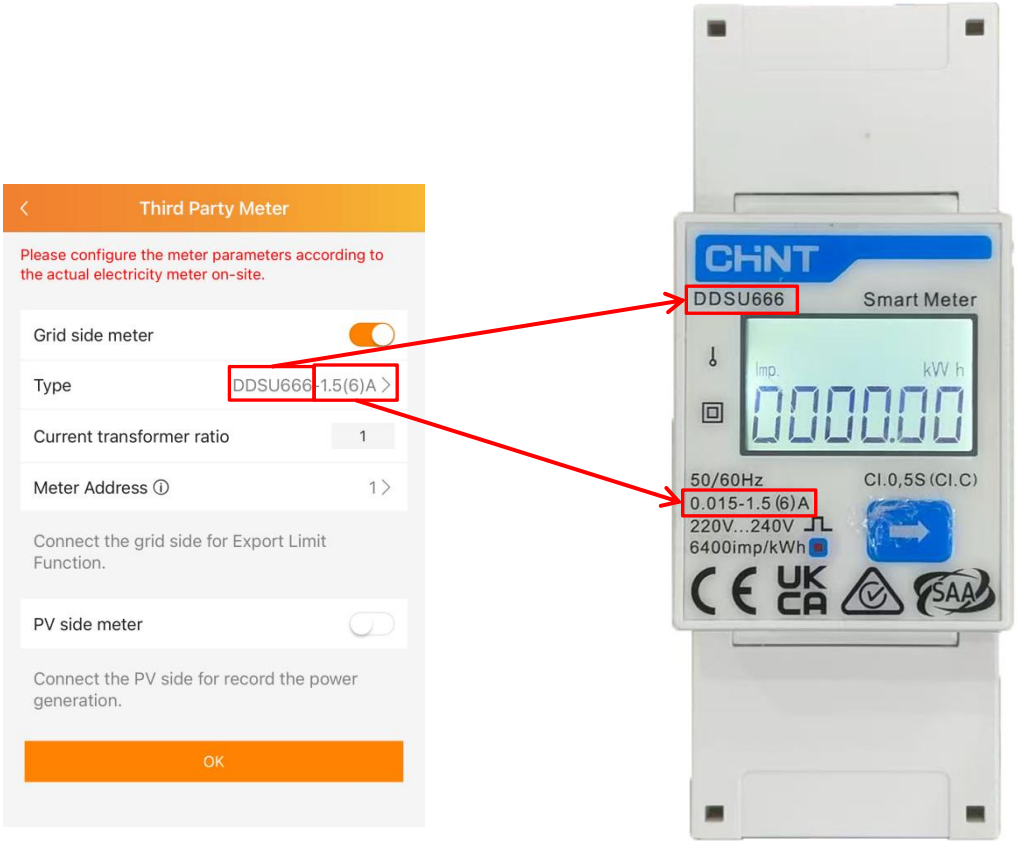
3. Electric Meter Settings

3.1 Electric Meter Configuration on ECU-R(Local access)

By connecting to the ECU-R hotspot via mobile phone, enter the Workspace and select **"Meter Settings"**. Then, configure the electric meter information and set the power limit. At present, **if you only have one Meter and need to realize the function of export power control, you can only fill in "Grid side meter" in "Configure Meter", and if you need to realize the function of measuring PV power generation data, you can fill in "PV side meter".**Fill in the "Power Limit" value for the permitted reverse current to the grid according to the local grid standard.(For example, In this case, the permissible reverse current power per phase is 1kW.)

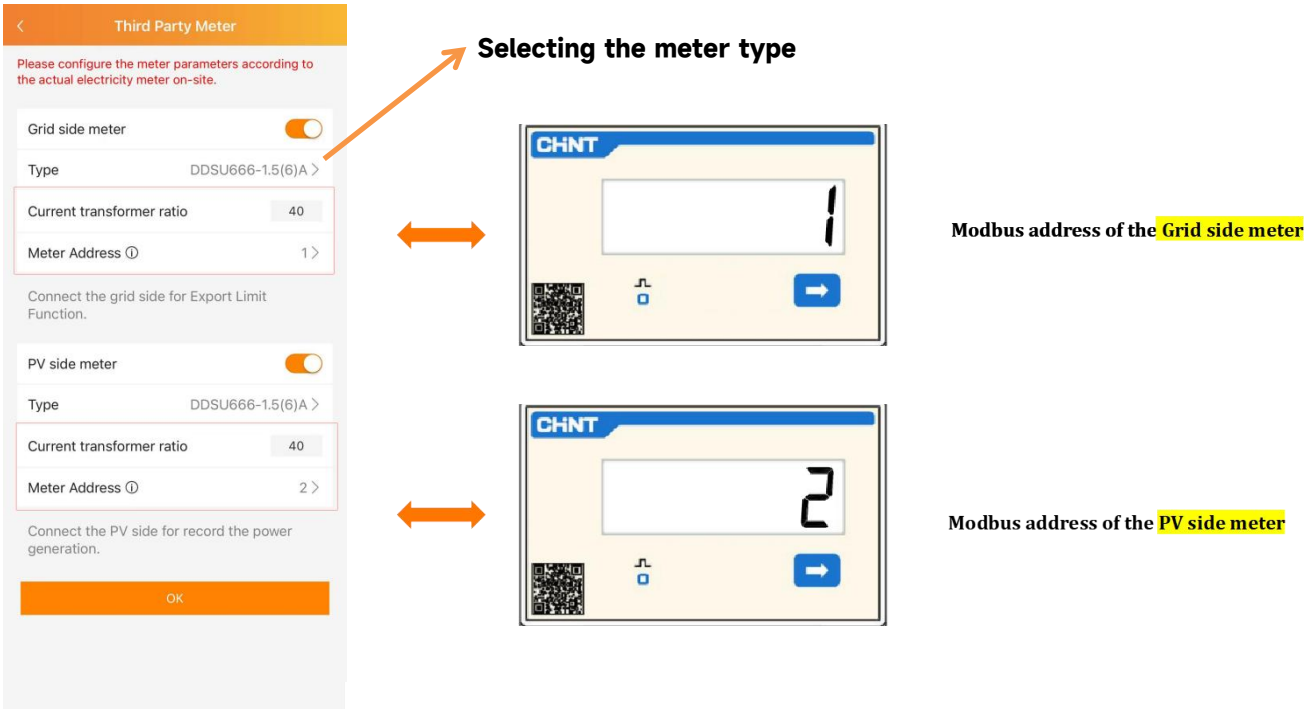


➢ **APP meter type selection and nameplate relationship**

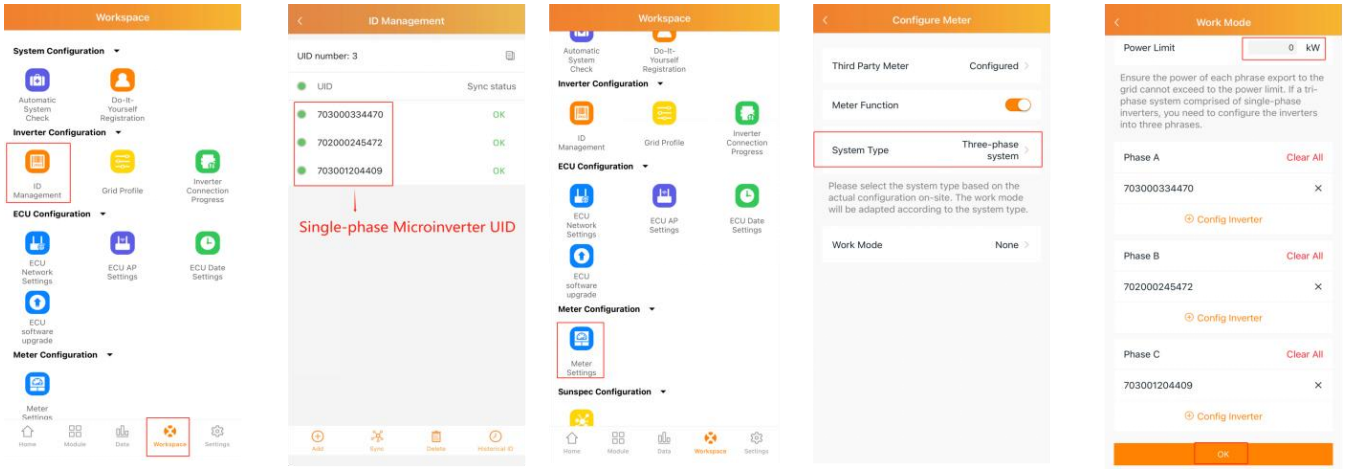


3.1.1 The Modbus address is consistent

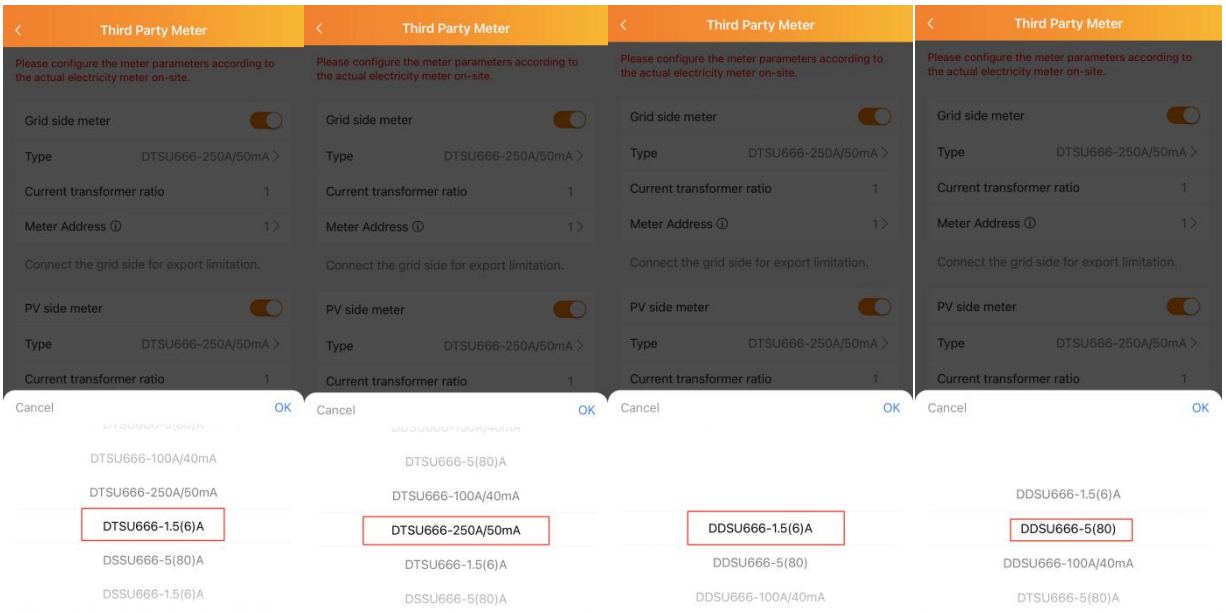
When configuring the meter for local access, it is important to note that the information filled in is consistent with the actual internal Modbus address of the meter(For example:**DDSU666-1.5(6)、DTSU666-1.5(6)**Need to fill in the **current transfomer ratio,** If CT is 200/5A, current ratio = 40.)



3.1.2 Configuration for Single-phase Inverters doing three-phase grid connection (Export Limit Function)



- **Single-phase Inverters doing three-phase grid connection,The meter must be of 3P4W(L1-L2-L3-N) type.**



①"**DDSU666-5(80)-230V**" corresponds to "**DDSU666-5(80)**".

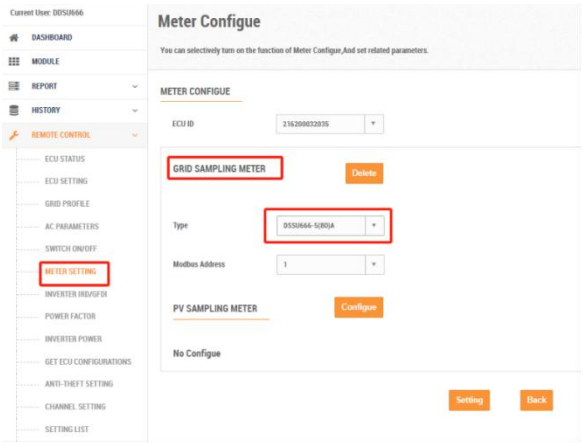
②"**DDSU666-CT-1.5(6)A-230V**" corresponds to "**DDSU666-1.5(6)**".

③"**DTSU666-1.5(6)-3X230/400V**" corresponds to "**DTSU666-1.5(6)**".

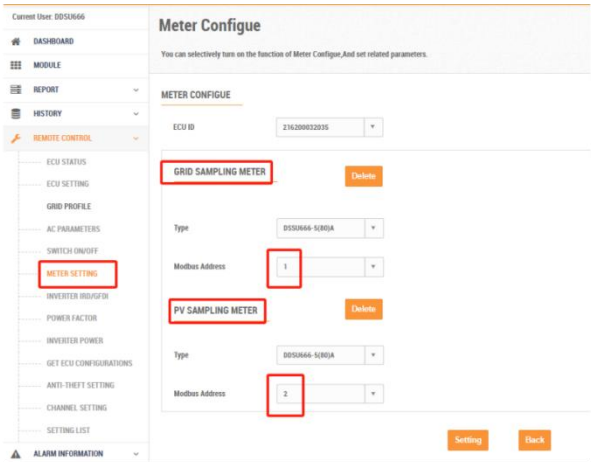
④"**DTSU666-250/50mA-3X230/400V**"corresponds to "**DTSU666-250/50mA**".

3.2 Electric Meter Configuration on EMA Web (Remote Control)

After you configure the electric meter information on ECU-R local, the EMA Web will display the configuration. The EMA page supports remote configuration antion of electric meter information.



Scene1

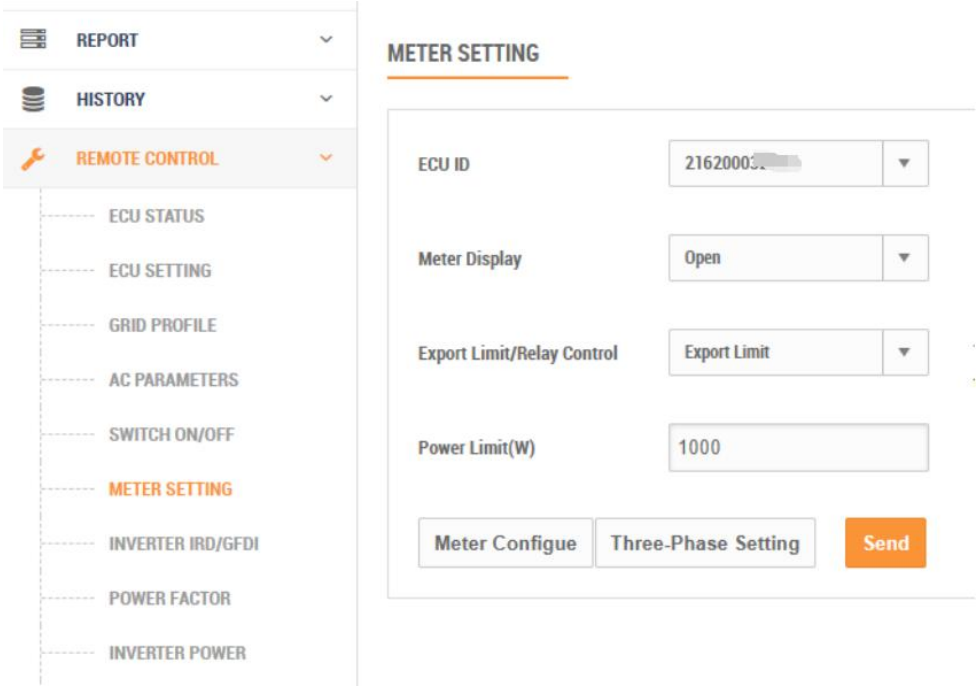


Scene2

Scene1: Configure only**"GRID SAMPLING METER"**for Export Limit Function.
Scene2: Configuration of **"GRID SAMPLING METER"** and **"PV SAMPLING METER"** for simultaneous Export Limit Function and PV generation measurement.

3.2.1 Power Limit Setting on EMA

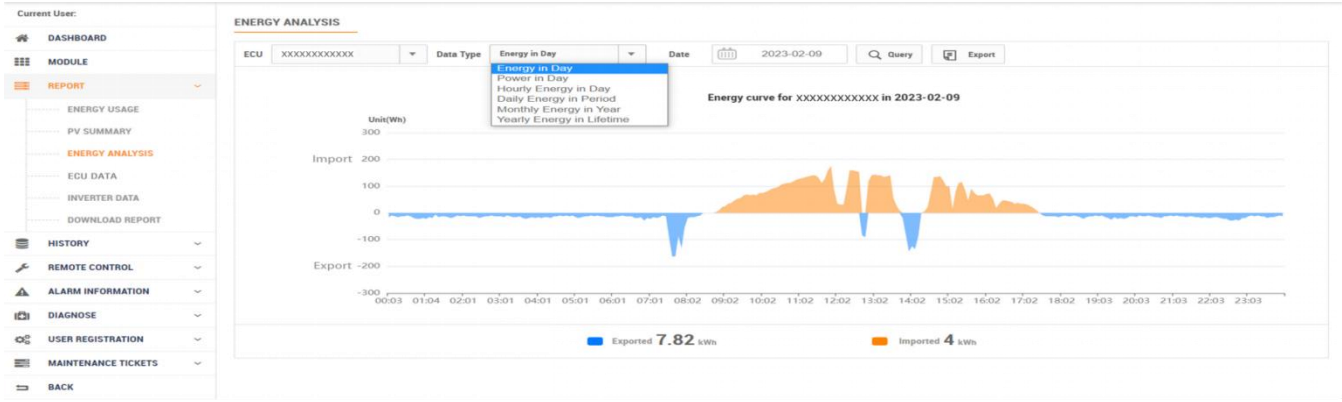
After you configure the electric meter information, the system applies the configuration and redirects to the meter function settings page within 15–20 minutes. If you want to modify the electric meter configuration, click "Back" to go back to the meter configuration page.Fill in the "Power Limit" value for the permitted reverse current to the grid according to the local grid standard.(For example, In this case, the permissible reverse current power per phase is 1000W.)



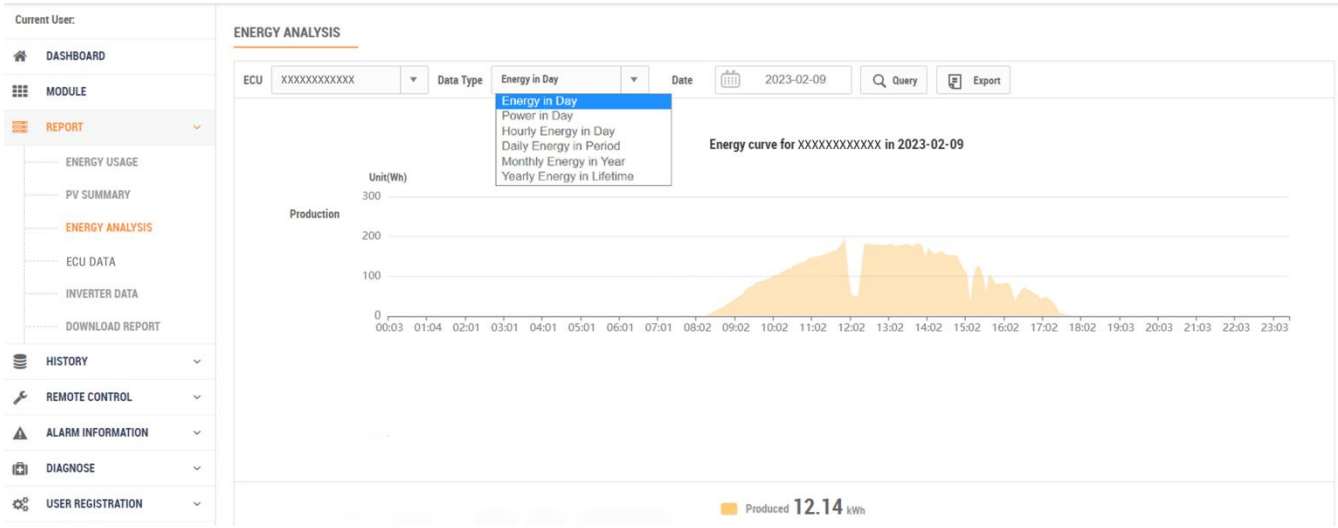
4.Data Display on EMA Web

The electric meter transfers export/import power data and photovoltaic power generation data to the ECU-R via RS485. Then, the ECU-R uploads the data to the EMA platform by using the router or a wireless network. Users can view energy information on the EMA platform or through the mobile application.

4.1 Export/Import Data (Meter is installed on the Grid Side)



4.2 PV Power Generation Data (Meter is installed on the PV Side)



4.3 PV Power Generation, Consume energy, and Export/Import energy Data (Meter is installed on the PV Side and Grid Side)

5.Meter Selection

Grid Type	APsystems Material Part No.	CHINT Meter Model	Reference Voltage & Frequency	Current Access Type	CT	Application
Single-phase (1P2W)	2273020003	DDSU666-5(80)A	220/230V 50/60Hz	Direct connection	No need	Circuits whose current is within 80A
	2273002013	DDSU666-1.5(6)A	220/230V 50/60Hz	Via CT	Purchased by the customer: 1 CT, secondary current must be 1A or 5A.	Maximum CT ratio less than 9999
Three-phase four-wire (3P4W)	2270105003	DTSU666-250A/50mA	3×230/400V 50/60Hz	Via CT	Standard configuration: 3 CTs of 250A, with package;	Circuits whose current is within 250A
	2270107003	DTSU666-1.5(6)A	3×230/400V 50/60Hz	Via CT	Purchased by the customer: 3 CTs, secondary current must be 1A or 5A.	Maximum CT ratio less than 9999