

Fox ESS EV Charger
Meter Wiring and Functional Description Manual



FOXESS CO.,LTD

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Meter Wiring Manual

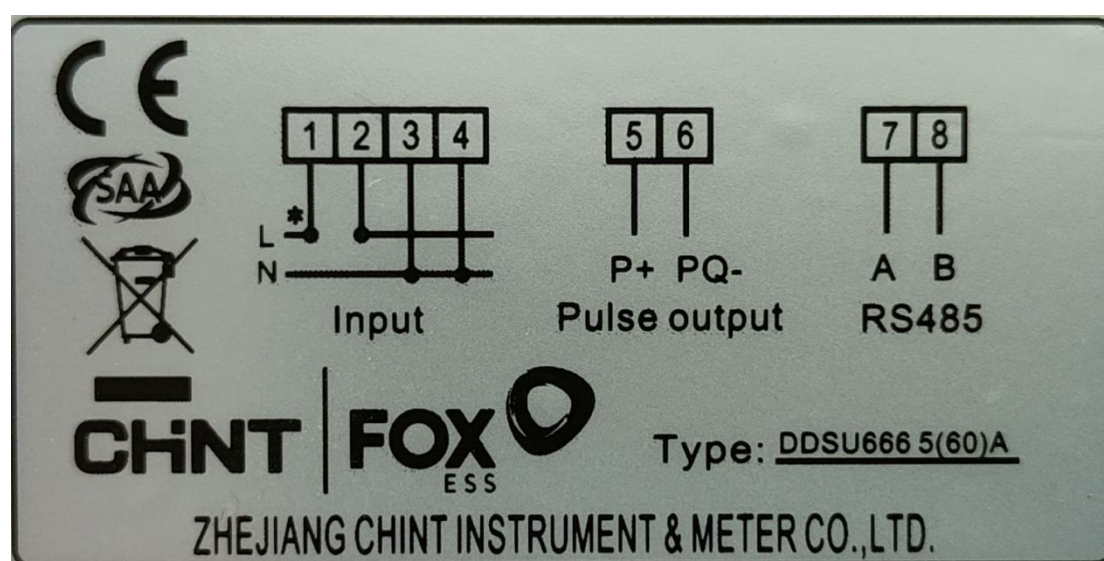
For the load balancing function and the PV linkage function you need to use with a bi-directional meter.

Below are the wiring methods for the three bi-directional meters, and at the end is a schematic diagram of how the meters are installed in the system.

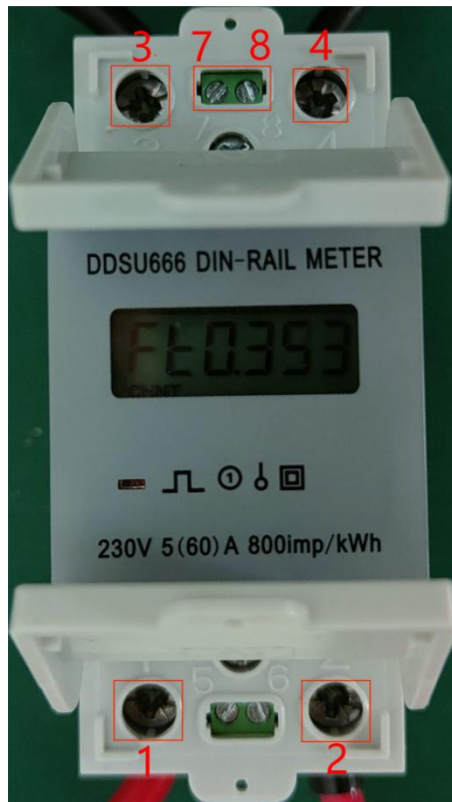
1.1 DDSU666 5(60)A

This meter is suitable for use with Fox ESS Product Series A 7.3kW single-phase EV charger.

Meter labels:



Wiring Instructions:



Pin 1 Connected to the output of grid meter L

Pin 2 Connect to EV Charger and household load L

Pin 3 Connect to the output of grid meter N

Pin 4 Connect to the EV Charger and household load N

Pin 7 Connect to 485 communication A of EV Charger

Pin 8 Connect to 485 communication B of EV Charger

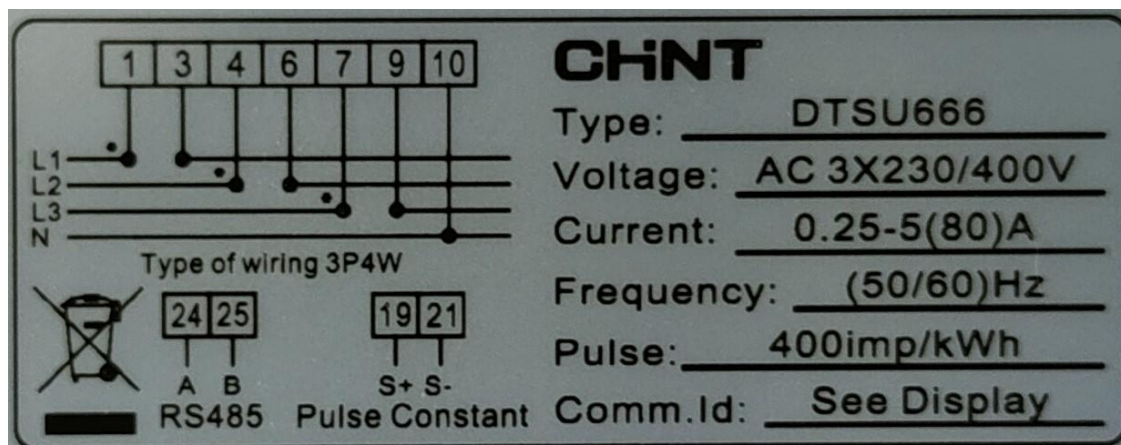
1. According to Fox ESS meter wiring label , connect meter pin 1 and pin 3 to grid meter output L and N respectively;
2. Pin 2 and pin 4 to EV Charger and household load L and N respectively;
3. Pin 7 and pin 8 to EV Charger 485 communication harness A and B respectively.

1.2 DTSU666 5(80)A

This meter is suitable for use with Fox ESS Product Series A 11kW and 22 kW three-phase EV charger.

The meter is recommended for public networks with currents less than 80A.

Meter labels:



Wiring Instructions:



- Pin 1 connect to grid meter output L1
- Pin 4 connect to grid meter output L2
- Pin 7 connect to grid meter output L3
- Pin 10 connect to grid meter output N
- Pin 3 connect to EV Charger and household load L1
- Pin 6 connect to EV Charger and household load L2
- Pin 9 connect to EV Charger and household load L3
- Pin 10 connect to EV Charger and household load N
- Pin 24 connect to EV Charger 485 communication harness A
- Pin 25 connect to EV Charger 485 communication harness B

1. According to the Fox ESS meter wiring label, connect Fox ESS meter pin 1, 4, 7, and 10 to grid meter outputs L1, L2, L3, and N respectively.
2. Connect Fox ESS meter pins 3, 6, 9, and 10 to input L1, L2, L3, and N of the EV Charger and household load respectively.
3. Connect pin 24 and pin 25 to A and B of the 485 communication harness of the EV Charger respectively.

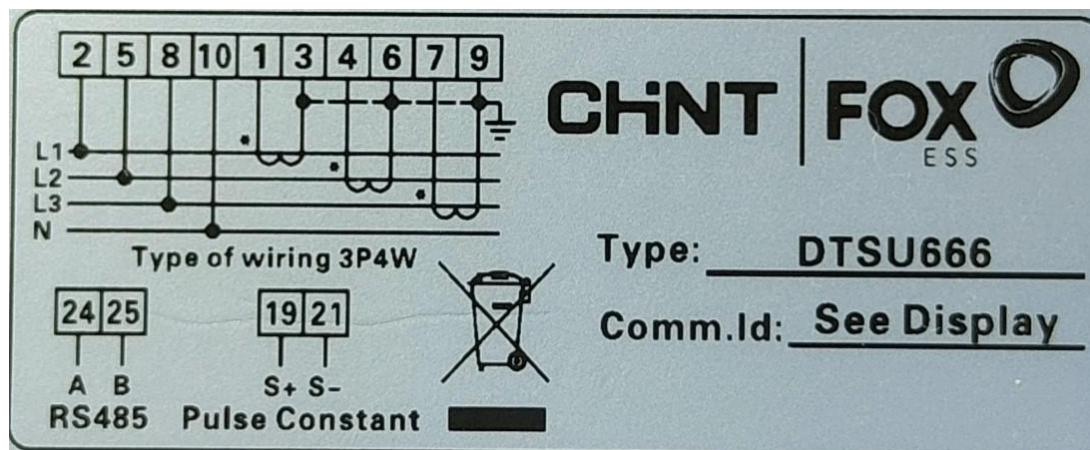
1.3 DTSU666 1.5(6)A

This meter is suitable for use with Fox ESS Product Series A 11kW and 22 kW three-phase EV charger.

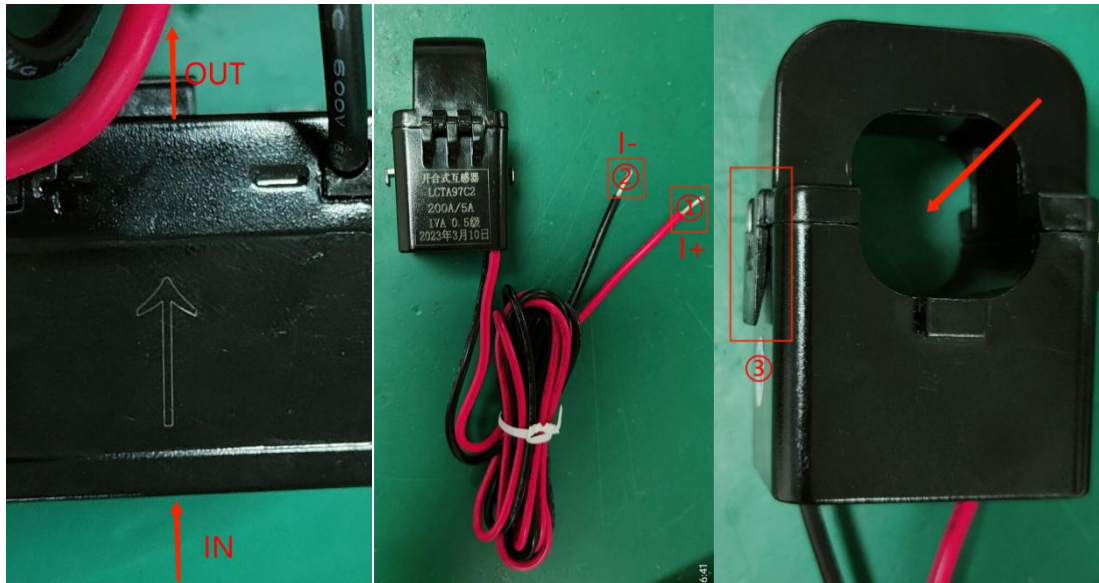
Currently Fox ESS offers CTs with a current ratio of 200A/5A.

The meter is recommended for public networks with currents greater than 80A and less than 200A.

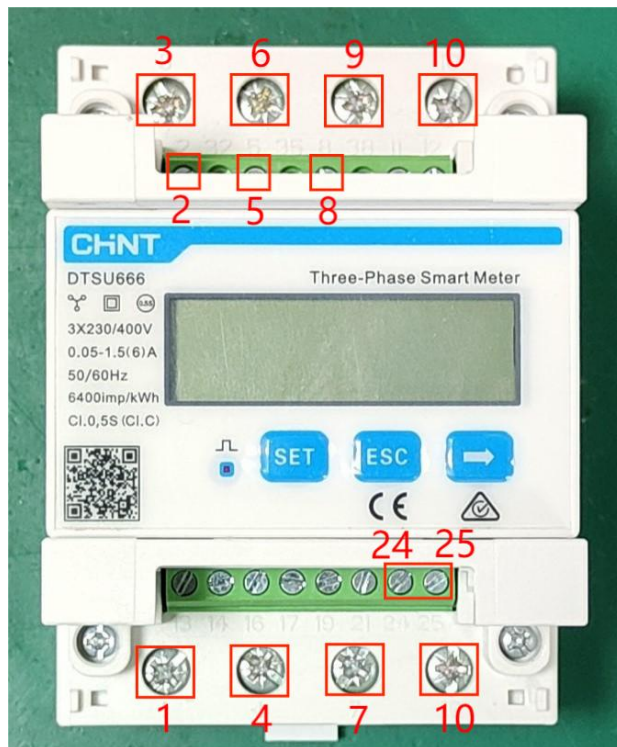
Meter labels:



Wiring Instructions:



1. ① Fox ESS meter CT I+
2. ② Fox ESS meter CT I-
3. Open the snap at ③ and connect the transformer to the output L1(CT1), L2(CT2) and L3(CT3) lines of the grid energy meter according to the direction shown in the diagram.

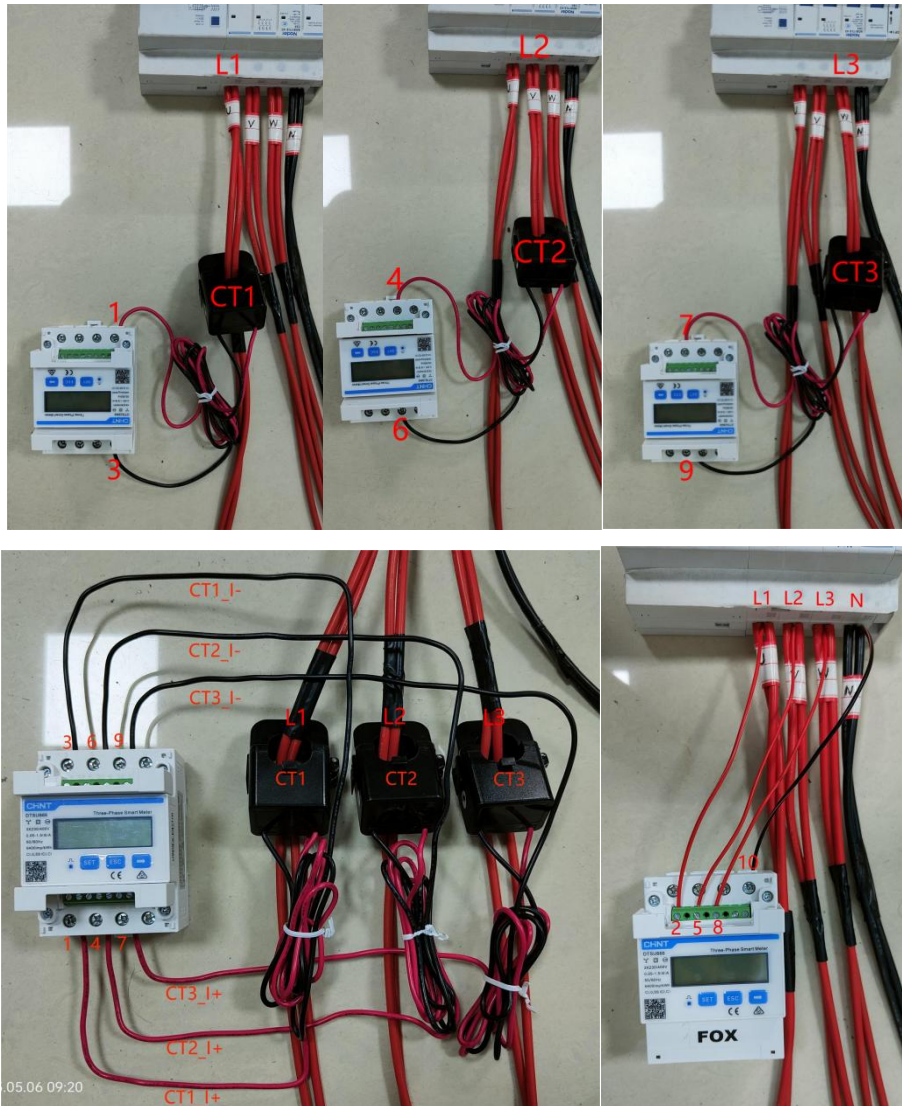


Pin 1 connect to the CT1 I+
 Pin 3 connect to the CT1 I-
 Pin 4 connect to the CT2 I+
 Pin 6 connect to the CT2 I-
 Pin 7 connect to the CT3 I+
 Pin 9 connect to the CT3 I-
 Pin 2 connect to the grid meter outputs L1
 Pin 5 connect to the grid meter outputs L2
 Pin 8 connect to the grid meter outputs L3
 Pin 10 connect to the grid meter outputs N
 Pin 24 connect to the EV Charger 485
 Communication
 harness A
 Pin 25 connect to the EV Charger 485
 Communication
 harness B

1. According to the Fox ESS meter wiring label, connect Fox ESS meter 1 and 3 pins to CT1 I+ and CT1 I- respectively, connect Fox ESS meter 4 and 6 pins to CT2 I+ and CT2 I- respectively, connect Fox ESS meter 7 and 9 pins to CT3 I+ and CT3 I- respectively, connect Fox ESS meter 2, 5 and 8 pins to grid L1, L2 and L3 respectively, and connect Fox ESS meter 10 pins to grid N.

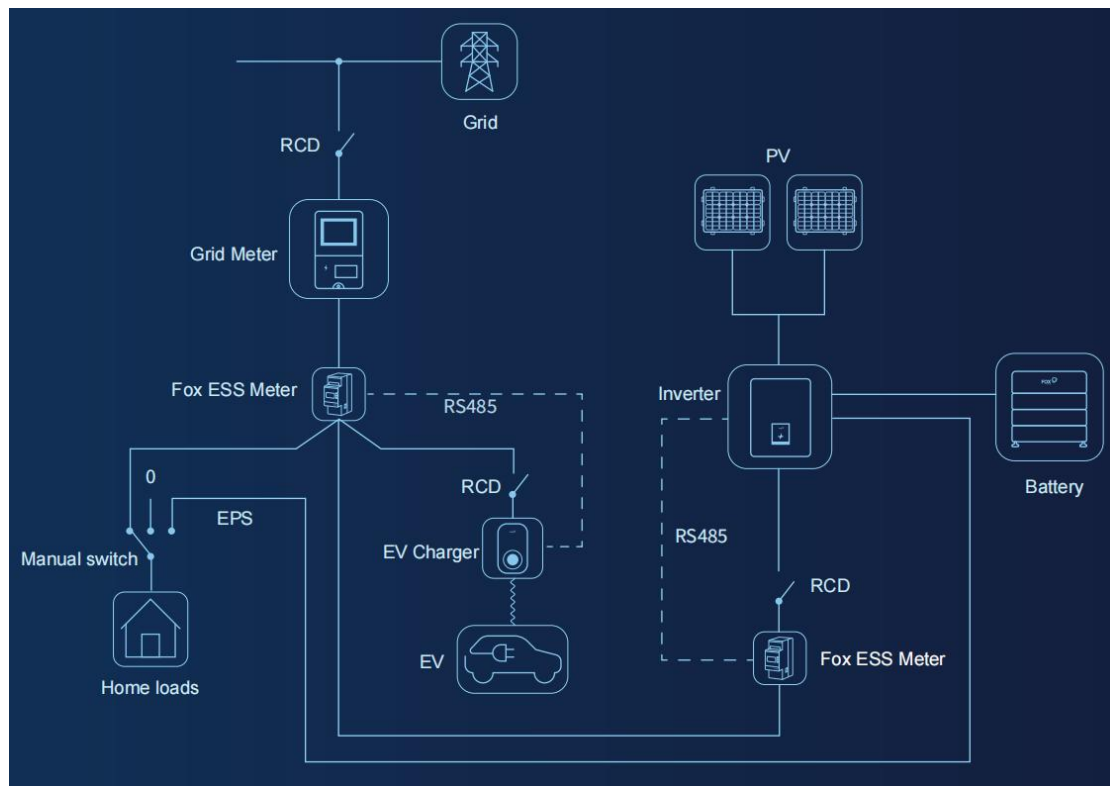
2. Connect Fox ESS meter pin 24 and pin 25 to A and B of 485 communication harness of EV Charger respectively.

Note: Fox ESS meter pins 3, 6 and 9 need to be connected in parallel to ground.



CT Meter Wiring Example

1.4 Example of meter installation location



The image above is a schematic of the meter installation location.

We need to install the meter at the entrance of the public network in order to realise the load balancing function and the PV linkage function.

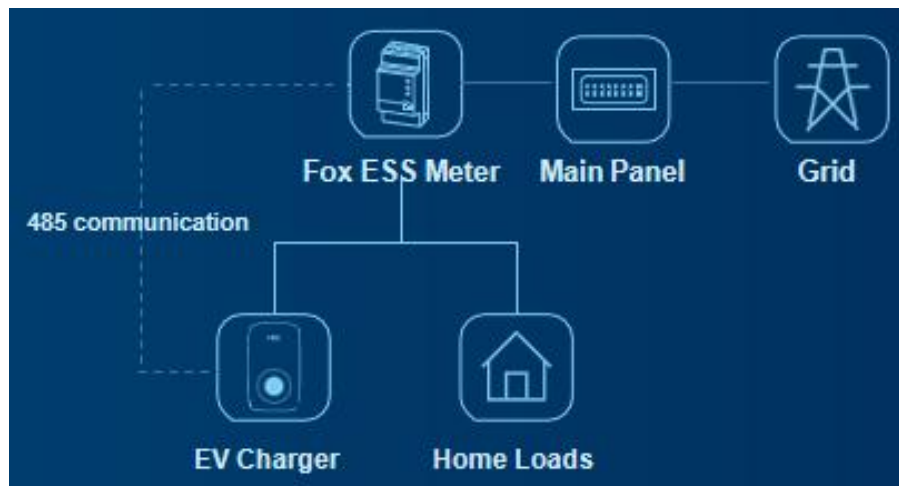
Currently, if our Fox ESS inverters and meters are already installed, a second meter must be added to enable the PV linkage and load balancing functions.

This meter needs to be installed at the entrance of the public network, in front of the inverter meter.

Functional Description

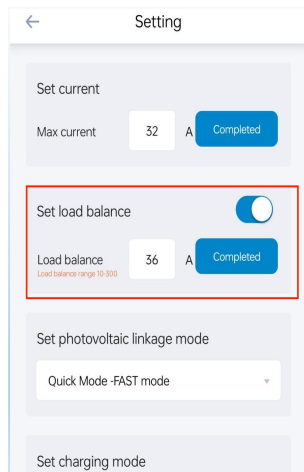
2.1 Load balancing (Single EV charger)

The charging pile and home load were installed to the Fox ESS meter, the 485 communication between the Fox ESS meter and the charging pile was connected, and then the load balancing capability of the charging pile was tested by adjusting the home load.



2.1.1 Load balancing function test

- (1) Set the load balancing limit current through APP and turn on the load balancing switch.



Note: The load balancing current set by APP is the maximum current allowed by the main gate of the grid entry, i.e. the sum of the maximum charging current of the charging pile (32A) and the maximum current of the user load should be less than the maximum current allowed by the main gate of the entry.

(2) Observe whether the output current of the charging pile will follow the adjustment by adjusting the magnitude of the household load current.

2.1.2 Load balancing test standard

(1) When the remaining capacity $\geq 32A$, the maximum output current of the charging pile is 32A.

(2) When $6A \leq \text{remaining capacity} < 32A$, the maximum output current of the charging pile is the current remaining capacity current.

- (3) When the remaining capacity is $<6A$, the charging pile enters the charging pause state to stop output, and queries the remaining capacity every 50s, and starts charging again when the remaining capacity is $>6A$.

Note: Remaining capacity = load balancing setting threshold current - household load current.

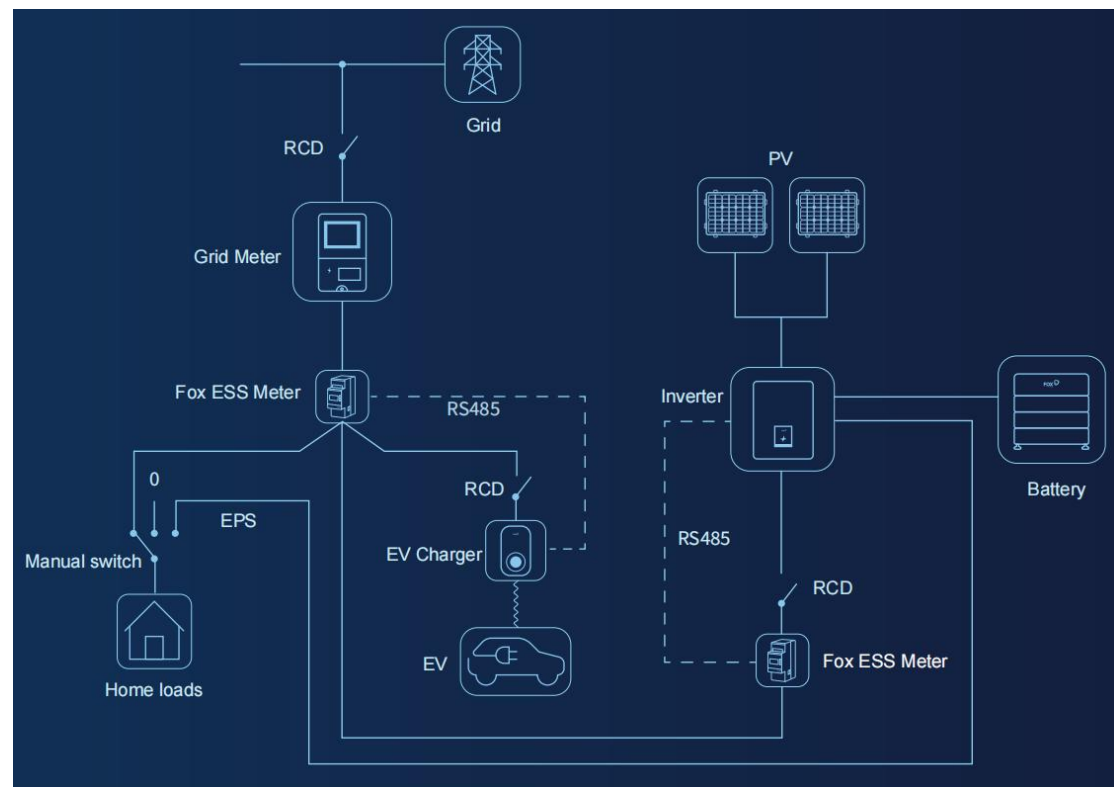
2.1.3 Test of 485 communication function

- (1) Disconnect the 485 communication wiring harness between the Fox ESS meter and the charging pile during standby, charging pile turn on the red light to give an alarm.
- (2) Disconnect the 485 communication wiring harness between the Fox ESS meter and the charging pile while charging, and the charging pile stops charging, and turn on the red light to give an alarm after unplugging the charging gun.
- (3) Disconnect the 485 communication wiring harness between the Fox ESS meter and the charging pile during the suspension of charging, and the charging pile stops charging, and turn on the red light to give an alarm after unplugging the charging gun.

- (4) Disconnect the 485 communication wiring harness between the Fox ESS meter and the charging pile when the charging is completed, and turn on the red light to give an alarm after unplugging the charging gun.

2.2 Photovoltaic linkage

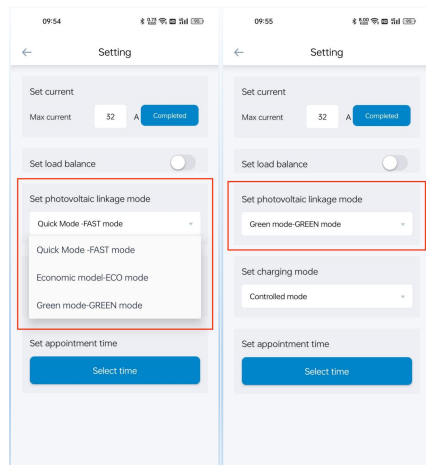
The charging pile, PV inverter and household load were installed to the same meter, connected the 485 communication between the Fox ESS meter and the charging pile, and then tested the current regulation ability of the charging pile in green, economic and fast mode by adjusting the current level of the household load.



2.2.1 Photovoltaic linkage Test method

1.Green mode

(1) Set PV linkage to green mode through APP.



Open the APP charging pile setting interface and select the PV linkage mode as green mode. In green mode, the charging post can only rely on the power generation capacity of the PV inverter to charge the electric vehicle.

(2) Make sure the PV inverter is in operation, change the size of the household load current and observe the output change of the charging pile.

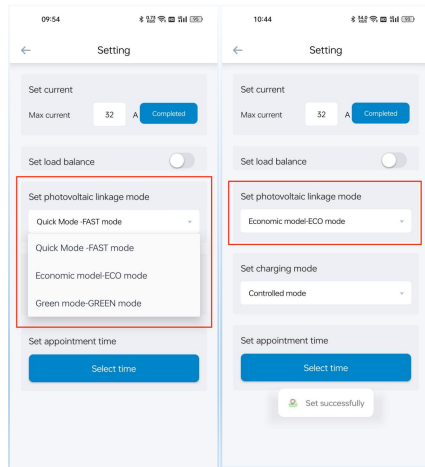
(3) When the charging pile detects the Fox ESS meter's current $<-6.5A$ (inverter output current-home load current $>6.5A$) the charging pile turns on charging and the charging current is the current Fox ESS meter's display current. During charging, the charging pile monitors the Fox ESS meter's current in real time and adjusts the charging current to ensure that the Fox ESS meter current is 0 during charging to ensure that the inverter power generation is balanced with the power consumption of the charging pile and the household load.

(4) When the charging pile is charging at the minimum current (6A),

the charging pile detects the Fox ESS meter's current > 0 , the charging will enter the pause state, and when the Fox ESS meter's current $< -6.5\text{A}$ is detected, the charging pile will turn on charging again.

2.Economic mode

(1) Set PV linkage as economic mode through APP.



Open the APP charging pile setting interface and select PV linkage mode as economy mode. The charging pile in economy mode will use the power generation capacity of the PV inverter to charge the EV as much as possible.

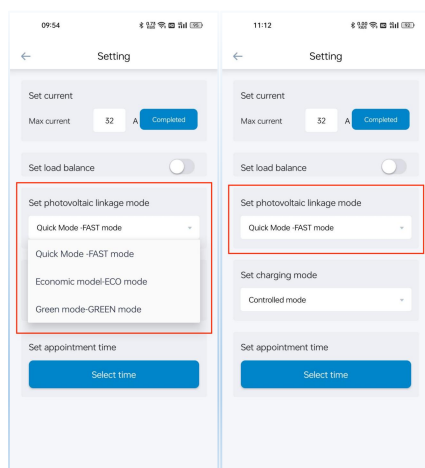
(2) Ensure that the PV inverter is in operation, change the size of the household load current, and observe the output change of the charging pile.

(3) When the charging pile detects the Fox ESS meter's current $< -6.5\text{A}$ (inverter output current - household load current $> 6.5\text{A}$) the charging pile turns on charging, charging current is the Fox ESS meter's display current; if the Fox ESS meter's current $> -6.5\text{A}$ is detected ,the charging pile turns on charging with 6A current.

- (4) During the charging process, the charging pile monitors the Fox ESS meter's current in real time, and adjusts the charging current as much as possible to keep the Fox ESS meter's current at 0, so as to ensure that the charging pile can use the maximum amount of photovoltaic power to charge the electric vehicle.
- (5) When the charging pile is charging with minimum current (6A), the charging pile detects the Fox ESS meter current > 0 , and the charging pile will keep 6A current to charge the electric vehicle.

3. Fast mode

- (1) Set PV linkage to fast mode through APP.



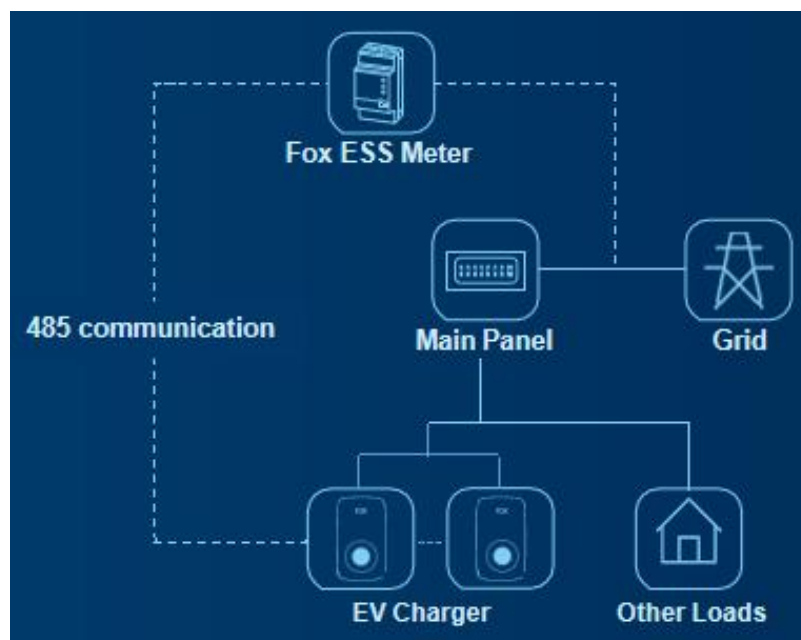
Open the APP charging pile setting interface to select PV linkage mode as fast mode. In fast mode, the charging post will charge at its own maximum output capacity, independent of PV power generation.

- (2) Make sure the PV inverter is in operation, change the household load current magnitude, and observe the output change of the charging pile.

- (3) After turning on the charging, the charging pile will charge with its own maximum output capacity, not affected by the size of the Fox ESS meter's current.

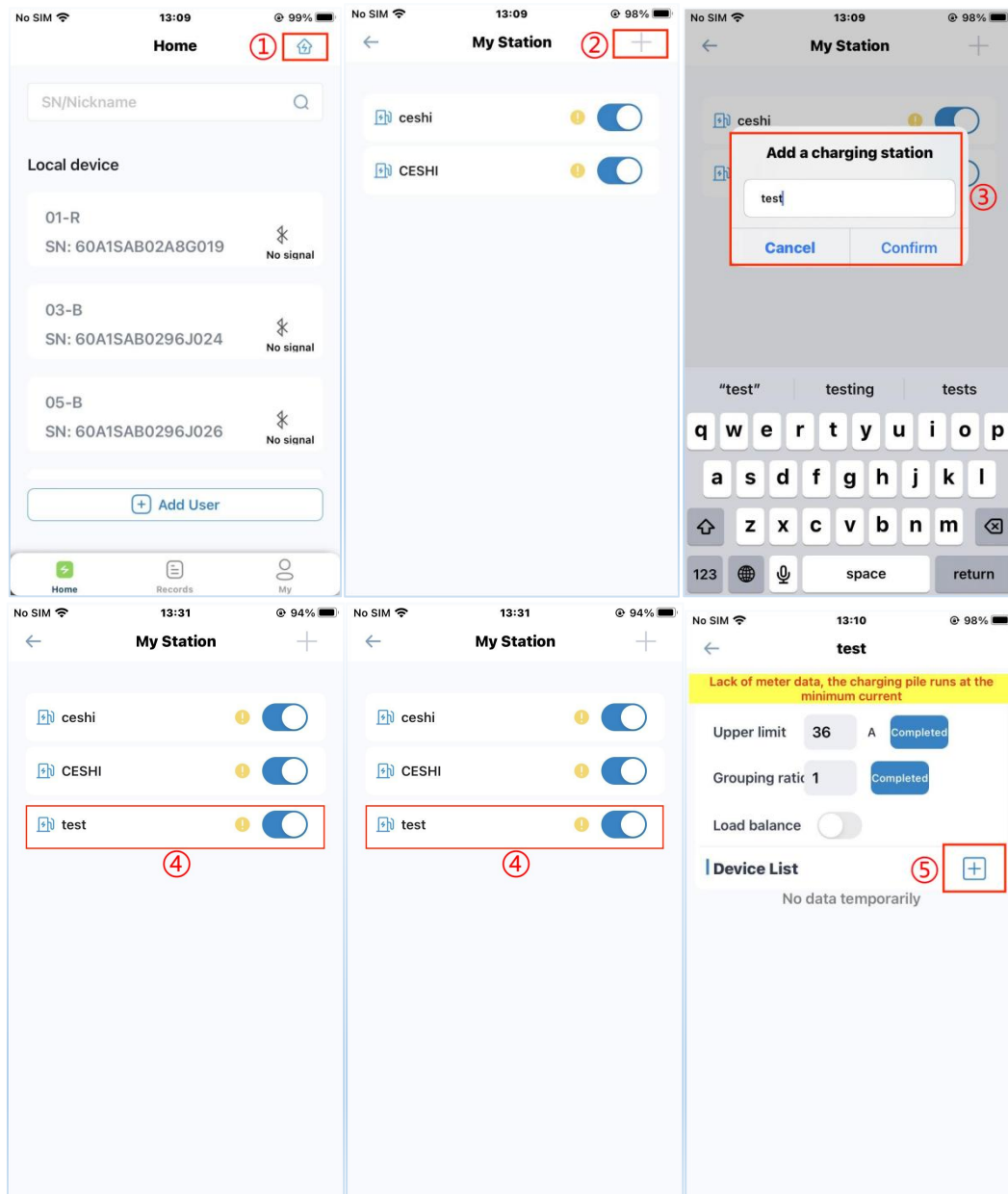
2.3 Load balancing(Multiple EV charger)

Install the charging pile and other loads to the grid energy meter, connect the 485 communication between the Fox ESS meter and one charging pile, and test the load balancing ability of the charging pile by adjusting the current level of other loads or changing the number of charging piles online in the station.



2.3.1 Load balancing test method

1. Create my station through APP

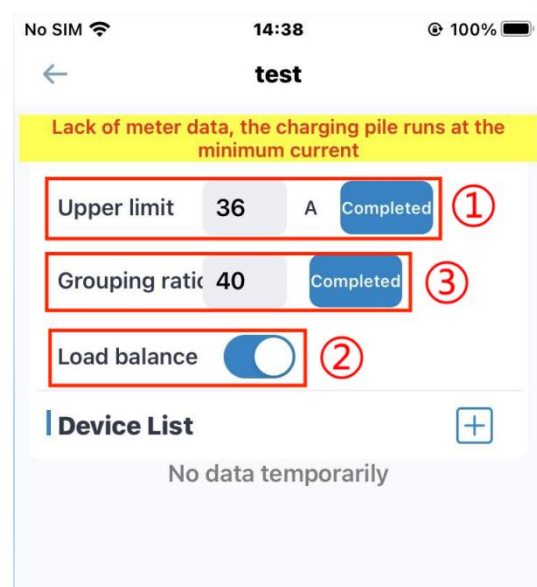


- (1) Open the APP and click the icon at the serial number ① on the home page to enter My Station.
- (2) Click the icon at the serial number ② to create a new station in the My Station screen.

- (3) Enter the name of the station in the pop-up interface of building a station at number ③ and click to confirm.
- (4) Click on the station created at serial number ④ to enter the station settings.
- (5) Click the icon at serial number ⑤ to add a charging pile in the station setting interface.
- (6) Select the charging pile that needs to be added to the station at serial number ⑥ and click to confirm.

Note: The charging pile must be connected to the network before it can join the station.

2. Set the station load balancing current



The serial number①can set the total load balancing current of the station

The serial number②can open the station load balance switch

The serial number③Setting group ratios by Fox ESS meter type

Note: The total load balancing current set by APP should be the maximum current allowed by the main panel input. The sum of the

maximum charging current of all charging piles in the station ($32A \times \text{number of charging piles}$) and the maximum current of other loads should be less than the maximum current allowed by the main panel input.

By adjusting the size of other load currents, observe whether the output currents of all charging piles will follow the adjustment.

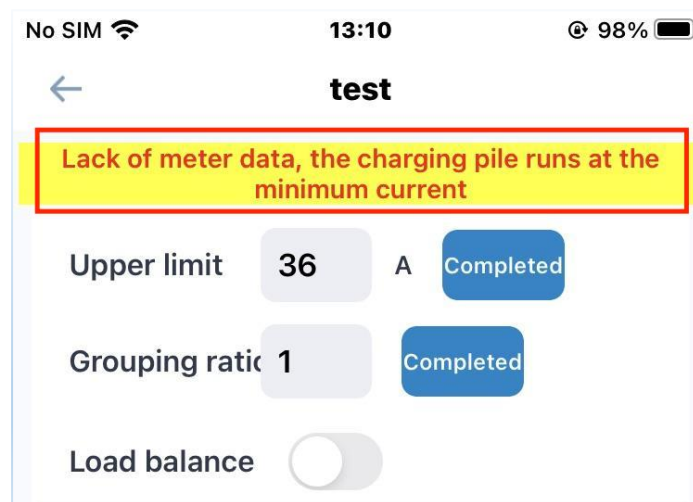
2.3.2 Load balancing test standards

- (1) When the remaining capacity/number of charging piles $\geq 32A$, the maximum output current of charging piles is 32.
- (2) When $6A \leq \text{remaining capacity/number of charging piles} < 32A$, the maximum output current of the charging post is the current remaining capacity/number of charging piles.
- (3) When the remaining capacity/number of charging piles $< 6A$, the charging pile enters charging pause state to stop output, and starts charging again when the remaining capacity/number of charging piles $> 6A$.

Note: Remaining capacity = APP set load balancing threshold current - household load current.

2.3.3 Test of 485 communication function

Disconnect the 485 communication harness connecting the charging pile and the Fox ESS meter, the maximum output current of each charging pile in the station will be set to 6A, and the station setting interface in APP will show no meter data and limit the output current information.



Disconnect the 485 communication harness between Fox ESS meter and charging pile, APP power station setting interface prompts information

2.3.4 Offline test of charging pile network in load balancing mode

- (1) Disconnect the network of charging piles not connected to the Fox ESS meter 485 communication, the maximum output current of charging piles whose network is offline will be set to 6A.

- (2) Disconnect the network of charging piles connected with Fox ESS meter 485 communication, the maximum output current of all charging piles in the station will be set to 6A.