

# USER'S MANUAL

## 1. General Description

DDS238-4 W type multi-function smart energy meter is designed to measure single phase two wire AC active energy and variable parameter. The meter have RS485 communication port and WIFI communication, it can use APP for remote reading and control on/off. All of its functions comply with the relative technical requirement for class 1 single phase watt hour meter in IEC62053-21 and its data communication rules obey the requirement of MODBUS-RTU and WIFI 802.11b/g/n. It is a long life meter with the advantage of high stability , high over load capability , low power loss and small volume .

The meter should be installed in suitable environment with ambient temperature range between  $-25^{\circ}\text{C} \sim +55^{\circ}\text{C}$ , the relative humidity less than 75% and temperature limits between  $-40^{\circ}\text{C} \sim +70^{\circ}\text{C}$ .

The meter is manufactured complying with international standard IEC62052-11 on “Electricity metering equipment (AC) General requirements tests and test conditions” and IEC62053-21 on “Static meters for active energy (classes 1 and 2)”.

## 2. Specification and Technical Parameters

### 2.1 Specification

|                      |                                                                           |
|----------------------|---------------------------------------------------------------------------|
| Meter type           | DDS238-4 W                                                                |
| Rate frequency       | 50 or 60 Hz                                                               |
| Rated current        | 5(60)A ,10(100)A                                                          |
| Rate voltage         | 120V / 220V / 230V /240V                                                  |
| Normal voltage range | 90%Un ~ 110%Un                                                            |
| Limits voltage range | 70%Un ~ 120%Un                                                            |
| kWh Accuracy         | Class 1                                                                   |
| R.M.S accuracy       | Class 0.5                                                                 |
| Pulse constant       | See meter                                                                 |
| RS485 port           | MODBUS-RTU protocol, 1200 ~ 9600bps, None parity ,default 9600 <b>bps</b> |
| WIFI                 | 802.11b/g/n ,only support 2.4GHz network , not support 5GHz network       |

### 2.2 basic parameters

Note: when it happens interrupt power-supply , the meter will not cut off , undervoltage event

|                                                           |                                                         |
|-----------------------------------------------------------|---------------------------------------------------------|
| Delayed power on/off time                                 | 60 $\pm$ 5s                                             |
| overvoltage / undervoltage / overload event judgment time | 3s                                                      |
| Overvoltage protection value                              | 270V $\pm$ 1(default) , APP can set value               |
| Overvoltage recovery value                                | 260V $\pm$ 1(default)= (APP overvoltage value - 10V)    |
| Undervoltage protection value                             | 170V $\pm$ 1(default) , APP can set value               |
| Undervoltage recovery value                               | 170V $\pm$ 1 , (default)= (APP overvoltage value + 10V) |
| Overload protection value                                 | 65A(default) , APP can set value                        |
| Delay on/off control                                      | 00:01—24:00 Hour                                        |

must last 3s , then it will cut off.

## 2.2 Technical Parameters

### 2.2.1 Basic tolerance

| Load current(A)                     | Power factor (CosΦ) | Basic error(%) |           |
|-------------------------------------|---------------------|----------------|-----------|
|                                     |                     | 1.0 class      | 2.0 class |
| 0.05I <sub>b</sub>                  | 1.0                 | ±1.5           | ±2.5      |
| 0.1I <sub>b</sub> —I <sub>max</sub> | 1.0                 | ±1.0           | ±2.0      |
| 0.1I <sub>b</sub>                   | 0.5(lag)            | ±1.5           | ±2.5      |
|                                     | 0.8(advanced)       | ±1.5           |           |
| 0.2I <sub>b</sub> —I <sub>max</sub> | 0.5(lag)            | ±1.0           | ±2.0      |
|                                     | 0.8(advanced)       | ±1.0           |           |

### 2.2.2 Self-consumption

Current circuit is less than 1.5VA

Voltage circuit is less than 2W/8VA

### 2.2.3 Starting current

Under the rated voltage , rated frequency and COSΦ=1 , the meter shall start and continue to register on application of 0.2% I<sub>n</sub> (if CT is used) or 0.4% I<sub>b</sub> .

### 2.2.4 Anti-creeping

The meter has anti-creeping logical circuit. When 115%U<sub>n</sub> is connected to the meter and current circuit is cut , the meter shall not create more than one pulse in a stipulated time

### 2.2.5 Average-life

The meter can be used for at least 10 years in normal operation specified in this manual

### 2.2.6 LCD: 6+2 (999999.99kWh)

## 3.Basic Features

3.1 Measuring positive & negative active energy with negative energy accumulated into positive energy,.

3.2 The meter also display three phase real voltage , real current , real active power , real power factor , real frequency

3.3 Pulse LED indicates working of meter , Pulse output with optical coupling isolation 18~27V 27mA .

3.4 RS485 communication port and WIFI communication

3.5 Measuring active energy without calibration under long term operation

3.6 display step by step with button

3.7 it can use APP software for data reading and remoter control on/off.

3.8 it has overvoltage and undervoltage protection , it can set value from APP

3.9 it has overload protection ,it can set value from APP

3.10 it has timing control function , it can set value from APP

3.11 it can reset the active energy to zero from APP

## 4. Working principles

Single phase voltage and current are sampled from respective sampling circuit and transformed into suitable signal, which is carried into integrated circuit , then the meter output pulse signal in positive proportion to measured power to drive step-motor counter or LCD counter to realize energy measurement. The meter has energy pulse output for testing with pulse width of  $80 \pm 20\text{ms}$

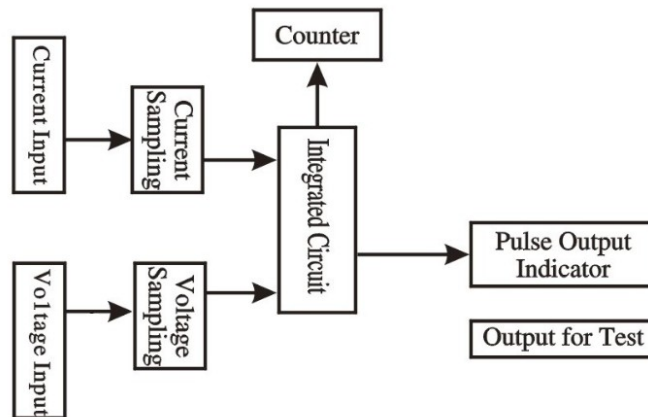


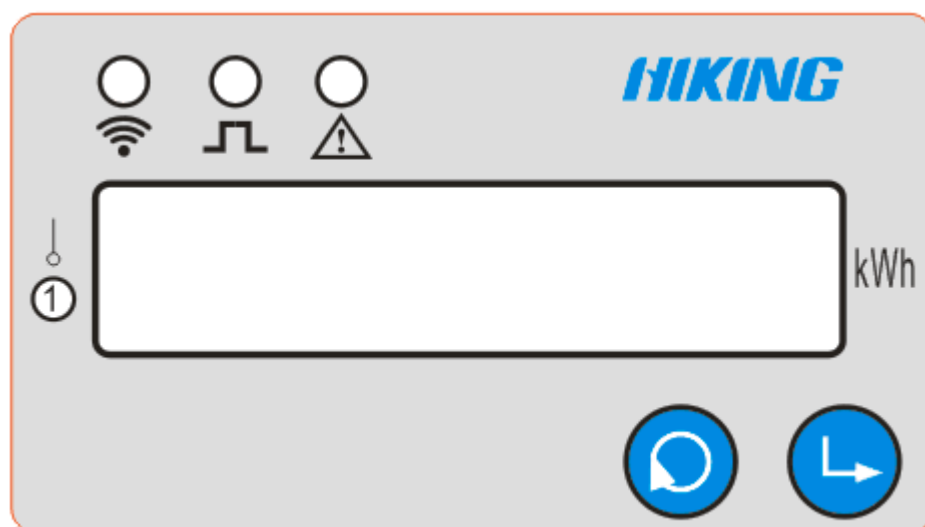
Diagram for Working Principles

## 5. Structure

The meter consists of meter base , meter cover , terminal base , terminal cover . there are lead seal on meter cover and terminal cover . A special screw is used to fix the terminal cover on which a lead seal can be installed

## 6. Usage

### 6.1 schematic diagram





WIFI led indication, if you push the setting button last 5s, the WIFI led will flash 1s

interval ,its means meter enter into the status of waiting for WIFI distribution network . if WIFI led light on 5s , light off 0.1s ,it means meter connect the WIFI successfully.



Impulse led indication: it will flash with different speed according the current load of the meter



Relay led indication: the led light off means relay switch on, the led on means relay switch off .



Down bond: you can push this button to check the different data display , it will

reset the resettable active energy to zero when you push this button last 5s ,but total active energy will not reset.

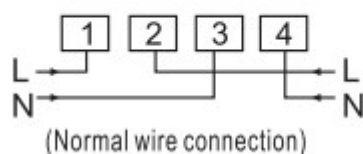


Setting button: if you push the setting button last 5s ,meter will enter into the status of

waiting for WIFI distribution network .if you want to reset status of WIFI distribution network, you also can push the setting button last 5s.

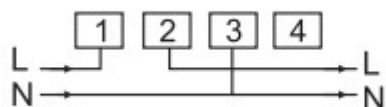
## 6.1 Connection diagram

PHOTO1



**Terminal 1 and 2 is for**

PHOTO2



**RS485 port , 2A and 1 B ,Impusle 6+ 5-**

## 6.2 Installation

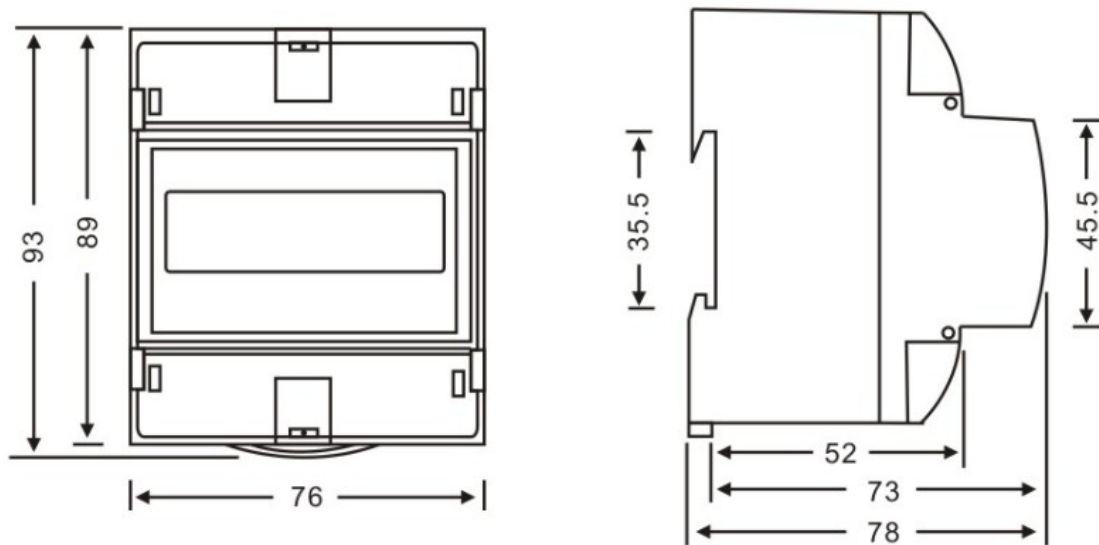
The meter can be installed on a 35 mm DIN rail

6.2.1 The meter can not installed and used until it is checked goods and sealed before delivery

6.2.2 The meter should be install in the water proof box indoor or outdoor . the meter's box should be fixed on strong and flame-resistant wall with a recommended height of about 1.8 m , where there is no corrosive gas around .

6.2.3 The meter should be install fully in accordance with connection diagram on the terminal cover, it is better to use copper as the leading wire for connection. All screws should be tightened.

## 6.2.4 Diagram for installation dimension



## 7. Transportation and Storage

- 7.1 Heavy impact should be burdened to the products while transportation and unpacking.
- 7.2 The products should be stored in the original package and kept in place with temperature between  $-40^{\circ}\text{C} \sim +70^{\circ}\text{C}$ , the relative humidity less than 75% and no corrosive gas around.
- 7.3 In storehouse, the meter should be placed on the shelf when kept in stock, there should not be more than 7 cartons piled up in vertical. Single-packed meters can not be piled up with more than 5 meters in vertical.

## 8. Warranty period

Within 12 months from the day of selling and provided that users operate correctly according to the requirement of the user's manual, if the meter doesn't reach its technical specification. It can be repaired or replaced in free of charge by the manufacturer.

## 9. Frame format

- 9.1 Read command (function code 03)

#### Send frame

| Meter ID | Function code | Register address | Data number | Check code (CRC) |
|----------|---------------|------------------|-------------|------------------|
| 1byte    | 1byte         | 2byte            | 2byte       | 2byte            |

#### Receive frame

| Meter ID | Function code | Data length n | Data area | Check code (CRC) |
|----------|---------------|---------------|-----------|------------------|
| 1byte    | 1byte         | 1byte         | n byte    | 2byte            |

### 9.2 Write command (function code 10)

#### Send frame

| Meter ID | Function code | Register address | Data number | Data length n | Data area | Check code (CRC) |
|----------|---------------|------------------|-------------|---------------|-----------|------------------|
| 1byte    | 1byte         | 2byte            | 2byte       | 1byte         | n byte    | 2byte            |

#### Receive frame

| Meter ID | Function code | Register address | Data number | Check code (CRC) |
|----------|---------------|------------------|-------------|------------------|
| 1byte    | 1byte         | 2byte            | 2byte       | 2byte            |

### 9.3 Energy meter register address

| Register address | Data number | Data item      | Data format                                                                                         | Data unit |
|------------------|-------------|----------------|-----------------------------------------------------------------------------------------------------|-----------|
| 0x0000           | 2           | Total kWh      | XXXXXX . XX                                                                                         | kWh       |
| 0x0001           |             |                |                                                                                                     |           |
| 0x0008           | 2           | Export kWh     | XXXXXX . XX                                                                                         | kWh       |
| 0x0009           |             |                |                                                                                                     |           |
| 0x000A           | 2           | Import kWh     | XXXXXX . XX                                                                                         | kWh       |
| 0x000B           |             |                |                                                                                                     |           |
| 0x000C           | 1           | Voltage        | XXX . X                                                                                             | V         |
| 0x000D           | 1           | Current        | XX . XX                                                                                             | A         |
| 0x000E           | 1           | Active power   | XXX . XXX                                                                                           | kW        |
| 0x000F           | 1           | Reactive power | XXX . XXX                                                                                           | kvar      |
| 0x0010           | 1           | Power factor   | X . XXX                                                                                             |           |
| 0x0011           | 1           | frequency      | XX . XX                                                                                             | Hz        |
| 0x0015           | 1           | ID + baud rate | First byte is ID 号 , the second byte is baud rate , 01~04 is means Respectively 9600、4800、2400、1200 |           |

Note 1: one register address is store 2 byte data ,so the data length read as 4 byte when data number is 2 .

Note 2: : you can use ID ID(0x00) to broadcast and got data when you do not know the meter ID.

But this ways is only for 1 pcs meter to connection on RS485 wire

## 10. Display item

|    | INFORMATION                | LCD DISPLAY |
|----|----------------------------|-------------|
| 01 | Impulse imp/kWh            | C 0000      |
| 02 | Total energy kWh           | 000000.00   |
| 03 | Positive kWh               | 00000.00    |
| 04 | Reverse kWh                | -00000.00   |
| 05 | Reset energy               | EP0000.00   |
| 06 | Real voltage V             | U 000.0     |
| 07 | Real current A             | A 00.00     |
| 08 | Real active power W        | P 0.0       |
| 09 | Real reactive power Var    | P 0.0       |
| 10 | Power factor COSΦ          | PF 0.00     |
| 11 | Real frequency Hz          | F 00.00     |
| 12 | Meter serial high 6 digits | H 000000    |
| 13 | Meter serial low 6 digits  | L 000000    |
| 14 | MODBUS ID                  | 001         |

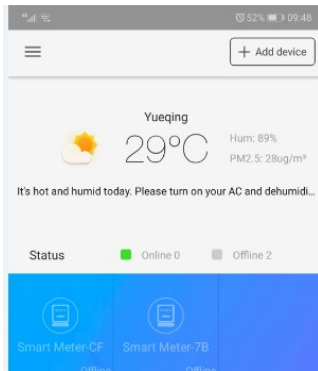
1 . Please scan the two-bar-codes to download the “WISEN” software  
插入二维码

### 二. Meter input power

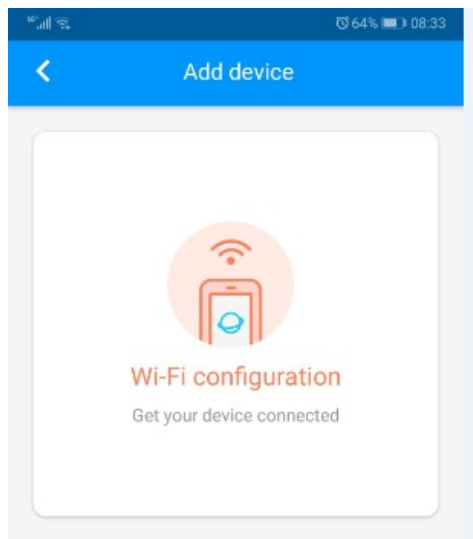
When the meter power on , you can push the setting button last 5s , meter enter into the status of waiting for WIFI distribution network and the WIFI led will flash 1s interval .  
its means meter enter into the status of waiting for WIFI distribution network . if WIFI led light on 5s , light off 0.1s ,it means meter connect the WIFI successfully.

### 二. Add device

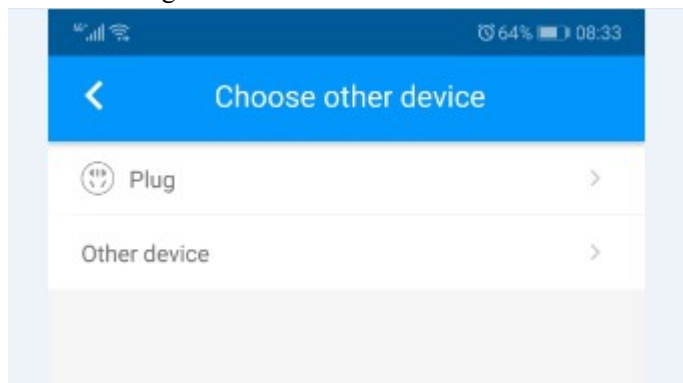
Please check firstly that your telephone have connected the available WIFI network , then click the “add device “ button .now the meter only used under 2.4GHz WIFI network , it can not use under 5GHz WIFI network .



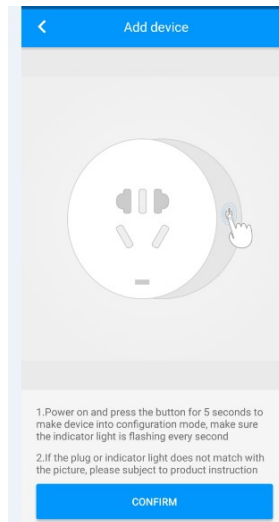
Select the WIFI distribution network



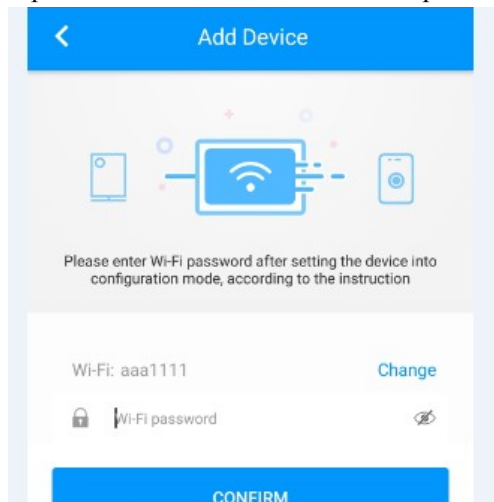
Select the Plug



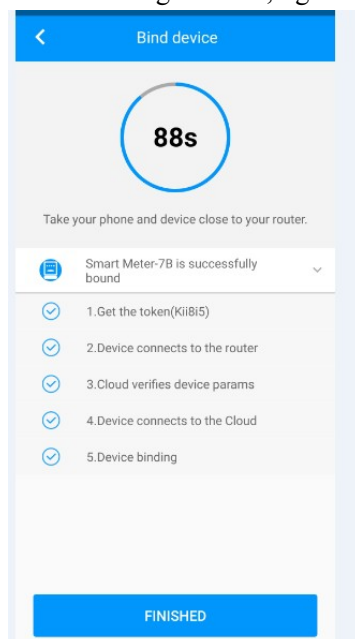
You can push the setting button last 5s , meter enter into the status of waiting for WIFI distribution network , then click confirm button



Input the WIFI network account and password , then confirmed to next step



if WIFI led light on 5s , light off 0.1s ,it means meter connect the WIFI successfully.



#### Note: WIFI led status

1. flash 1s interval : meter enter into the status of waiting for WIFI distribution network
2. light on 5s ,light off 0.5s : meter have connect the WIFI and login in cloud serve

#### APP Menu instruction

The meter will display online or offline after you add the device successfully .  
You can click the device to check the meter detailed information



You will see the active energy data and remote control button and timing setting button in the menu

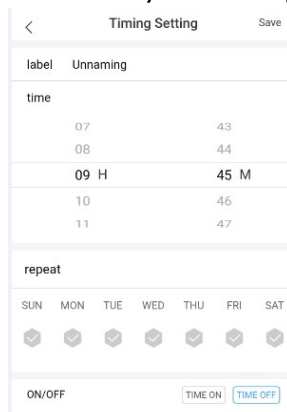


Control button : used for control on / off of meter output

Reset button: used for reset the total active energy to zero

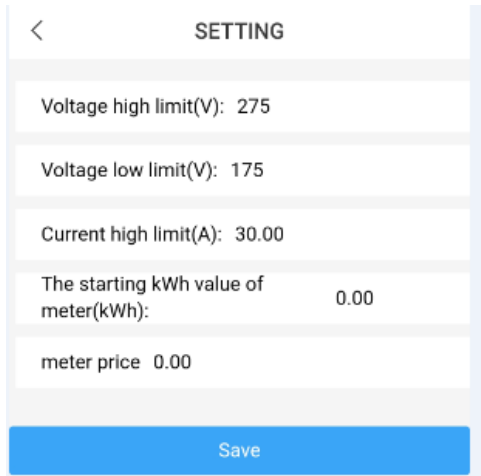
Timing button: used for timing control on/off and time delay control on/off

1. time control :you can add the time which is control and which is control off ,if you do not select week , it will save as single time control . if you select the week, it will save as cycle control .
2. time-delay control : you can set 1minute to 24hour max to time delay control. For example ,you can use delay time control to control off the Battery car charging after 2hours .



the meter do not have time clock internal ,the time control is decide to cloud serve, so make sure the meter connect the available WIFI network.

3.Setting button : for protection value and unit price ,starting active energy value setting .



The screenshot shows a mobile application interface for the 'SETTING' menu. At the top, there is a back arrow and the title 'SETTING'. Below the title, there are five rows of settings, each with a label and a value: 'Voltage high limit(V): 275', 'Voltage low limit(V): 175', 'Current high limit(A): 30.00', 'The starting kWh value of meter(kWh): 0.00', and 'meter price 0.00'. At the bottom of the screen, there is a blue button labeled 'Save'.

Voltage high limit(V): the overvoltage protection , it will cut off after high than this value.

Voltage low limit(V): the undervoltage protection , it will cut off after lower than this value.

The voltage high limit value must bigger than the Voltage low limit value .

Current high limit(A): the overload protection, it will cut off after high than this value.

For overvoltage/undervoltage/overload event , these status must last 3 s ,so the meter will cut off for protection .it will delay 60s to confirm the voltage and current recover to normal status after cut off . it will switch on automatically after confirmed the value recover to normal status.

Starting kWh value :this value is used for calculating the “contrast active energy”. If the user want to know the power company meter have run how many after fixed time, you can input the current total active energy of the power company in here ! for example ,the power company meter is display 50kWh, you can input the 50kWh in the starting kWh value.

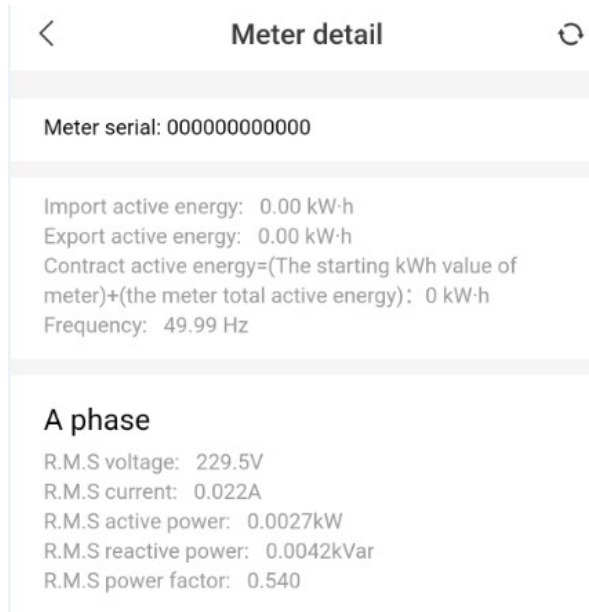
Meter price : how much price for each kWh

#### History kWh

It will show the last 7 days and 30 days total active energy consumption  
And total active energy cost . (only special order in some country)

#### Meter detail

It will show R.M.S value and bi-direction active energy and contrast active energy



Import active energy : it measure the total positive active energy

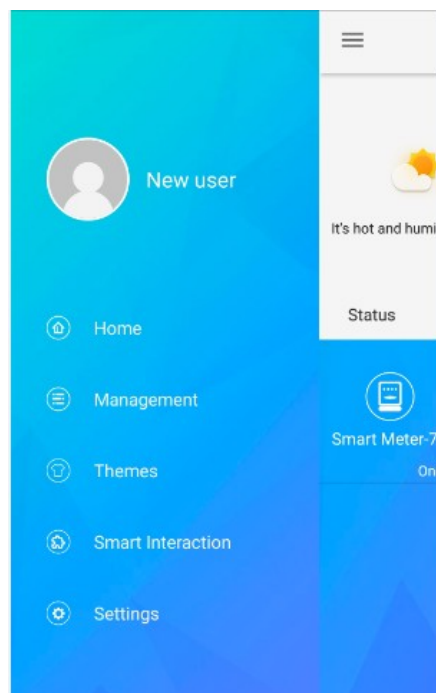
Export active energy : it measure the reverse active energy , such as solar power generation , reverse wire connection , some power generator working .

Normally, the total active energy= | Import active energy | + | Export active energy |

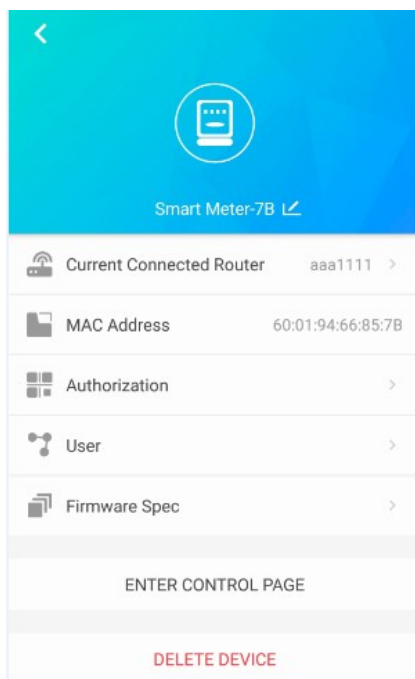
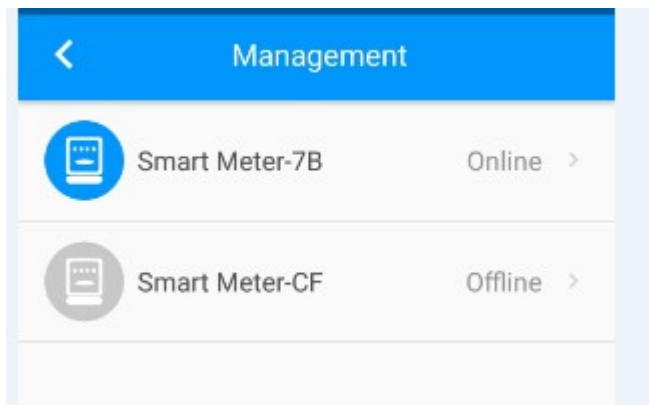
Contrast active energy : it is used for contrast the kWh running with the power company meter or other kWh meter .

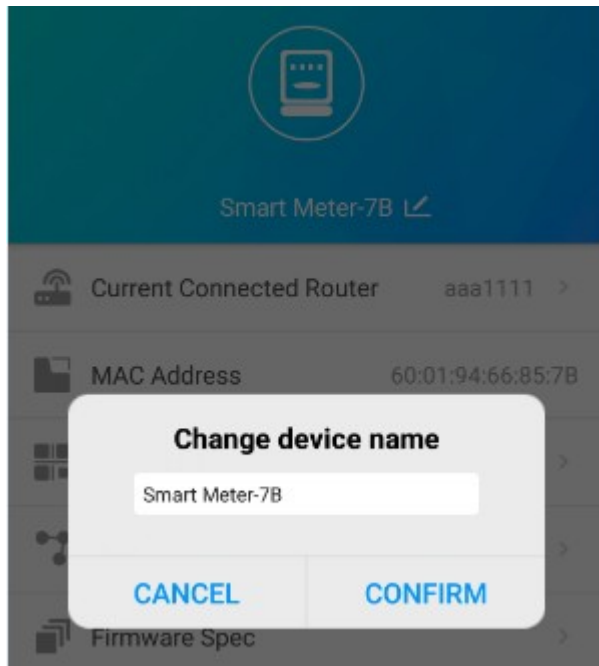
R.M.S value all measure the Current instantaneous value

## Home menu



Management : you can change the name of your meter and delete the meter from your device list





Smart interaction: you can use voice to control the meter on/off , now only support the Cat Elf smart sound and Echo smart sound device