WIFI IVAPT

Single Phase

Smart Meter

USER MANUAL

Ver.002218

1. General Description

WIFI IVAPT type multi-function protective 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℃～+70℃,the relative humidity less than 75% and temperature limits between and-40℃～+70℃.

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

2.1Specification

Meter type	WIFI IVAPT
Rate frequency	50 or 60 Hz
Rated current	5(60)A (Min measure 20mA)
Rate voltage	120V / 220V / 230V /240V (90～300V)
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(current/voltage/active power/reactive power)
Temperature	±3℃
Pulse constant	See meter
RS485 port	MODBUS-RTU protocol, 1200～9600bps,None parity ,default 9600bps
WIFI	802.11b/g/n ,only support 2.4GHz network , not support 5GHz network

2.1.1 basic parameters

Delayed recovery after protection	60s(default) , APP can set value 5～512s
overvoltage / undervoltage / overload event judgment time	3s (default) APP can set value 0.1■60s
Overvoltage protection value	270V±1(default)=APP can set value 100■270V
Overvoltage recovery value	265V±1(default)= (APP overvoltage value - 10V)
Undervoltage protection value	170V±1(default)=APP can set value 90■250V
Undervoltage recovery value	180V±1(default)= (APP overvoltage value + 10V)
Overload protection value	100A(default)=APP can set value10■100A
Temperature protection value	80℃(default)=APP can set value-30℃～+100℃.

Note: when it happens interrupt power-supply (power grid off), the meter will not cut off , undervoltage event must last 3s , then it will cut off.

2.2 Technical Parameters

2.2.1 Basic tolerance

Load current(A)	Power factor (Cos Φ)	Basic error(%)	
		1.0 class	2.0 class
0.05Ib	1.0	±1.5	±2.5
0.1Ib—Imax	1.0	±1.0	±2.0
0.1Ib	0.5(lag)	1.5	2.5
	0.8(advanced)	1.5	
0.2 Ib—Imax	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 COS Φ=1 , the meter shall start and continue to register on application of 0.2% In (if CT is used) or 0.4% Ib .

2.2.4 Anti-creeping

The meter has anti-creeping logical circuit. When 115%Un 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 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 display total active energy, positive active energy , negative active energy , total reactive energy , balance active energy
3.3 The meter also display real voltage , real current , real active power , real power factor , real frequency
3.4 Pulse LED indicates working of meter
3.5 It can control on/off by hand when fast push the button 3 times quickly under prepay ment function close
3.6 Measuring active energy without calibration under long term operation
3.7 Display step by step with button
3.8 APP can display total active energy, positive active energy , negative active energy and real parameter and remote control on/off.
3.9 Hour/Day/Month/Year history active energy consumption tracking by APP, and also can output excel records by email.
3.10 It has overvoltage and undervoltage protection , it can set value from APP .Each protection function can be opened/closed as customer requirement
3.11 It has overload protection ,it can set value from APP
3.12 Voice control on/off function
3.13 Alarm event records and on/off operation records on APP
3.14 Prepayment function, if balance energy used up. It will cut off automatic. This function can be opened/closed by APP
3.15 Energy data can store on memory chip when power off, it also still measure energy when lose WIFI connection and it will update the energy on APP when connect WIFI again
3.16 It has timing control function , it can set value from APP
3.17 It can reset the active energy to zero from APP
3.18 It have active power/temperature 15minutes interval curve only one day
3.19 It have energy consumption cost and carbon emission on APP
3.20 It suit for solar power generation using , Import energy and export energy display separately on APP and RMS active power will display positive and negative symbols on APP
3.21 RS485 communication port and WIFI communication
3.22 It has electric leakage protection ,it can set value from APP(it need special order)

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 appropriation 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+20ms

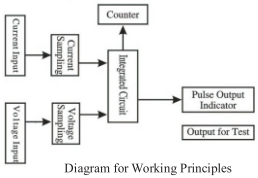


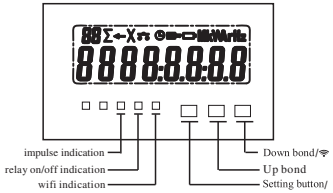
Diagram for Working Principles

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 down bond last 10s, 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 all time,it means meter connect the WIFI successfully.

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

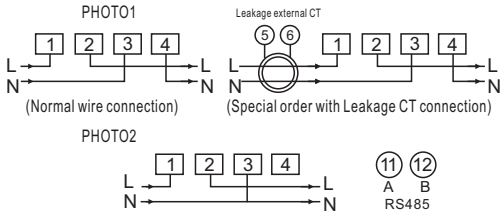
Relay led indication: the led light off means relay switch on, the led on means relay switch off .

△ Up bond: it used for display step by step and setting value under setting mode.

Down bond: it used for display step by step and setting value under setting mode. If you push this button last 10s, meter will enter into the status of waiting for WIFI distribution network.

SET Setting button: you can push this button last 3s enter into change the Modbus-RTU ID and baudrate of RS485 port and setting overvoltage/undervoltage/ overload protection/ temperature protection/electric leakage protection.

6.1 Connection diagram



6.2 Installation

The meter can be installed on a 35 mm DIN rail

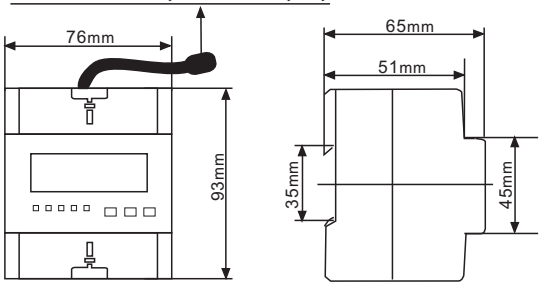
6.2.1 The meter can not installed and used until it is checked goods and sealed before delivery

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

Note: the black wire is temperature sensor ,keep it dry



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℃～+70℃,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 f 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 0x0001	2	Total kWh	XXXXXX．XX	kWh
0x000C 0x000D	2	Reactive kvarh	XXXXXX．XX	kvarh
0x0008 0x0009	2	Export kWh	XXXXXX．XX	kWh
0x000A 0x000B	2	Import kWh	XXXXXX．XX	kWh
0x0016	1	Voltage	XXX．X	V
0x0019	1	Current	XX．XX	A
0x001E	1	Active power	XXX．XXX	kW
0x002B	1	Power factor	X．XXX	
0x0011	1	frequency	XX．XX	Hz
0x0033	1	Relay	1 means power on, 0 means power off	
0x0015	1	ID + baud rate	First byte is ID，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

	Display Item		LCD display	
01	Impulse constant	imp/kWh	C	0000
02	Total active energy	kWh	00	000000.00
03	Import active energy	kWh	01	000000.00
04	Export active energy	kWh	02	000000.00
05	Total reactive energy	kvarh	10	000000.00
06	Balance energy	kWh	E	000000.00
07	Real voltage	V	UA	000.0
08	A phase real current	A	IA	000.000
09	Active power	kw	P	00.000
10	Total conjunction reactive power	kvar	q	00.000
11	Total conjunction power factor	COSΦ	PF	0.000
12	Temperature	℃	F	000.0
13	Leakage current	A	IL	0.0000
14	Frequency	Hz	F	00.00
15	RS485 baudrate		b	0000
16	Meter serial high 6 digit		H	000000
17	Meter serial low 6 digit		L	000000
18	RS485 ID		id	000

Setting mode display instruction:

LCD Code	Parameters setting	default	Max.	Min.	Marking
Er1	Last five records of protection reason		5	1	Protection reason: overvoltage Ub A undervoltage UL A over current Ib A high temperature Fo low temperature FL electric leakage ILo
b	Baudrate	9600	9600	1200	
Id	Communication address	1	245	1	
de	Function mode	1	4	1	
de1	Mode 1				overvoltage protection, under voltage protection and over-current protection and electric leakage protection automatic switch off/on
de2	Mode 2				overvoltage protection, under voltage protection and over-current protection and electric leakage protection automatic switch off/manual switch on
de3	Mode 3				Close function of overvoltage protection, under voltage protection and over-current protection and electric leakage protection ,always keep the output load switch off
de4	Mode 4				Close function of overvoltage protection, under voltage protection and over-current protection and electric leakage protection ,always keep the output load switch on
SS	Delay time in load switch on after input power on	5s	512s	5s	It means switch on the output load after how many times when product input power on again
Uo	Overvoltage protection value	270V	300 V	85 V	If the value exceed the range , the LCD will display off and closed this protection function
UoH	Overvoltage recovery value	265 V	300 V	85 V	This value must be smaller than overvoltage protection value. or it will default set as overvoltage protection value -5V when you save
UL	Under voltage protection value	170 V	300 V	85 V	If the value exceed the range , the LCD will display off and closed this protection function

U.H	Under voltage recovery value	175 V	300 V	85 V	This value must be smaller than under voltage protection value. or it will default set as under voltage protection value +5V when you save
Io	Over current protection value	100A	100A	1 A	If the value exceed the range , the LCD will display off and closed this protection function
SU	overvoltage / under voltage fault judgment time	10s	60s	0.1s	It means the fault must be last how many times then it will make output load switch off when happen fault
SF	Delay time setting for recovery load after voltage protection	5s	512s	1s	It means the product must wait for how many times then make the output switch on again after happen protection
SI	Over current fault judgment time	3s	60s	0.1s	It means the fault must be last how many times then it will make output load switch off when happen fault
SH	Delay time setting for recovery load after over load protection	60s	512s	1s	It means the product must wait for how many times then make the output switch on again after happen protection
fo	High temperature protection	80℃	100℃	-30℃	If the value exceed the range , the LCD will display off and closed this protection function
foH	High temperature recovery value	75℃	100℃	-30℃	This value must be smaller than high temperature protection value. or it will default set as high temperature protection value -5℃ when you save
fL	Low temperature protection	0℃	100℃	-30℃	If the value exceed the range , the LCD will display off and closed this protection function
fLH	Low temperature recovery value	5℃	100℃	-30℃	This value must be bigger than low temperature protection value. or it will default set as low temperature protection value +5℃ when you save
ILo	Electric leakage protection	0.030A	0.600A	0.010A	If the value exceed the range , the LCD will display off and closed this protection function

APP OPERATION INSTRUCTION

1.Please download the “ SMART LIFE ” software from google play or App store.

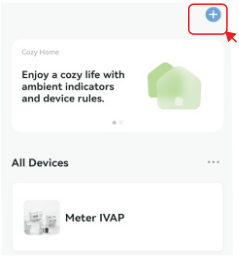
2.Meter input power

When the meter power on, you can push the setting button last 10s, meter enter into the status of waiting for WFI distribution network and the WIFI led will flash 1s interval. It means meter enter into waiting for WIFI distribution network

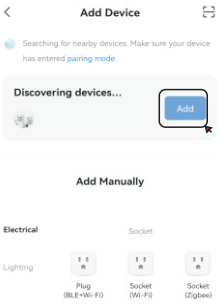
3.Add device

Please check firstly that your telephone have connected the available WIFI network, then click the “ add device ” button . If you open the Bluetooth, it will automatic find the meter which is waiting for adding.

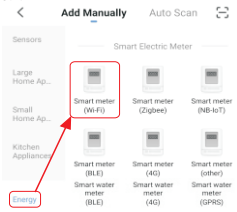
3.1



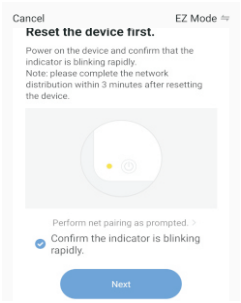
3.2.1



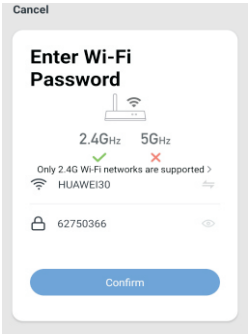
3.2.2


Add Manually
Auto Scan
Sensors
Smart Electric Meter
Large Home Ap...
Small Home Ap...
Kitchen Appliances
Energy
Smart meter (Wi-Fi)
Smart meter (Zigbee)
Smart meter (NB-IoT)
Smart meter (BLE)
Smart meter (4G)
Smart meter (other)
Smart water meter (BLE)
Smart water meter (4G)
Smart water meter (GPRS)

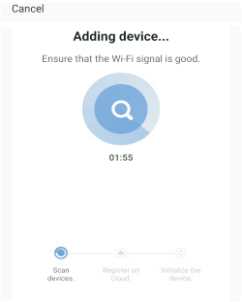
3.3


Cancel
EZ Mode
Reset the device first.
Power on the device and confirm that the indicator is blinking rapidly.
Note: please complete the network distribution within 3 minutes after resetting the device.
Perform net pairing as prompted.
Confirm the indicator is blinking rapidly.
Next

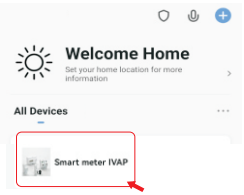
3.4


Cancel
Enter Wi-Fi Password
2.4GHz
5GHz
Only 2.4G Wi-Fi networks are supported
HUAWEI30
62750366
Confirm

3.5


Cancel
Adding device...
Ensure that the Wi-Fi signal is good.
01:55
Scan devices.
Register on Cloud.
Initialize the device.

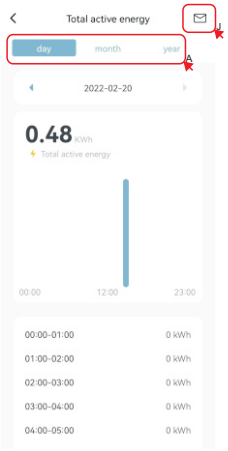
3.6



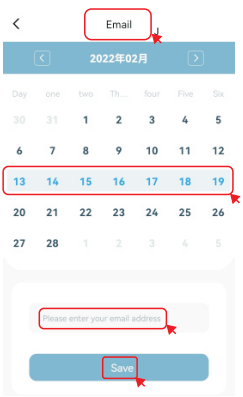
3.7

(A). History energy records for total energy ,import energy and export energy which you can move the hour energy window to select , it also can output excel format as week/month selection. Click the hour energy window you can enter into the history record menu .
(B). You can see the meter on/off records under operation record
(C). You can see voltage and current protection alarm under alarm log
(D). Switch button means on/off
(E). Data means 15minutes interval active records
(F). Timing button means you can set different time for control on/off or countdown control function
(G). Detail button you can see the APP all reading parameters
(H). This meter have temperature display function
(J). Click the energy history menu , then click the ✉ to output the records to email
(K). Setting menu

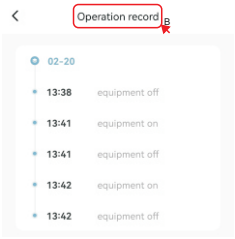
3.7.1


Total active energy
day
month
year
A
2022-02-20
0.48 kWh
Total active energy
00:00
12:00
23:00
00:00-01:00 0 kWh
01:00-02:00 0 kWh
02:00-03:00 0 kWh
03:00-04:00 0 kWh
04:00-05:00 0 kWh

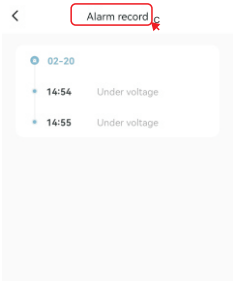
3.7.2


Email
2022年02月
Please enter your email address
Save

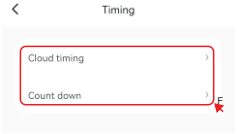
3.8


Operation record
B
02-20
13:38 equipment off
13:41 equipment on
13:41 equipment off
13:42 equipment on
13:42 equipment off

3.9

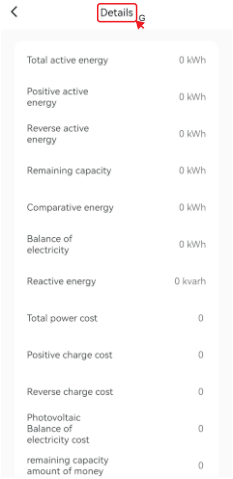

Alarm record
C
02-20
14:54 Under voltage
14:55 Under voltage

3.10

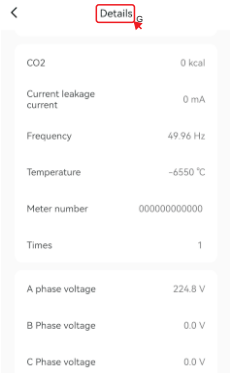


3.11

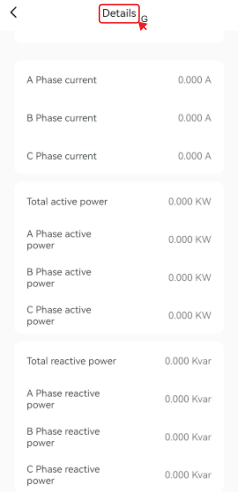
3.12.1



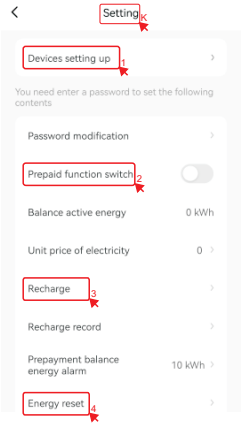
3.12.2



3.12.3

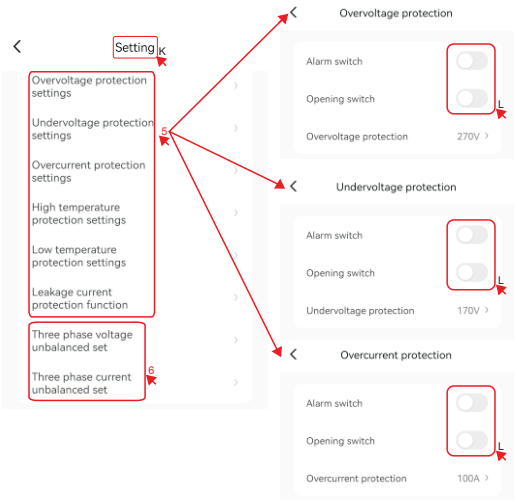


3.13.1



- Balance of electricity means import energy reduce export energy
- Remaining capacity means the meter balance energy value under prepayment function
- Comparative energy means the setting value of starting energy of another meter add this wifi meter running energy
- Photovoltaic balance of electricity cost means remaining capacity X unit price
- CO2 means carbon emissions , you can setting the index as 0.785 or according to your country real condition under setting menu
- Active power KW will display negative symbol when current reverse under solar power generation

3.13.2


Setting
K
Overvoltage protection settings
Undervoltage protection settings
Overcurrent protection settings
High temperature protection settings
Low temperature protection settings
Leakage current protection function
Three phase voltage unbalanced set
Three phase current unbalanced set
5
6
Overvoltage protection
Alarm switch
Opening switch
Overvoltage protection
270V
L
Undervoltage protection
Alarm switch
Opening switch
Undervoltage protection
170V
L
Overcurrent protection
Alarm switch
Opening switch
Overcurrent protection
100A
L

1. For setting information should input the password 0000(default) to change the setting data. You also can revised the password.

2. Prepaid function can control on/off , if open function ,the balance energy if used up . it will cut off automatically.

3. Recharge menu means you can buy energy into the meter under prepayment function.

4. Energy reset means make all energy data reset to zero.

5. You can open/closed the voltage , current protection and electric leakage protection function as your required .

(L).Alarm switch means protection alarm log on/off

Opening switch means on/off this protection function. You can select Alarm switch on , opening switch on or meantime off . also you can select only Alarm switch on , opening switch off.

6. Note this meter do not have unbalance protection function ,please ignore it.

7.Voltage protection time means the fault must be last how many times then it will make output load switch off when happen fault.

8.This meter do not have Power on delay protection function.

9.Voltage recovery delay time means the product must wait for how many times then make the output switch on again after happen voltage protection.

10.Current recovery delay time means the product must wait for how many times then make the output switch on again after happen overload protection.

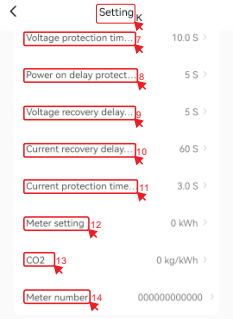
11.Current protection time means the fault must be last how many times then it will make output load switch off when happen overload fault.

12.Meter setting means the starting energy kWh of another meter . for example , you installed the WIFI meter , and you also have a power company meter , power company have running 10 kWh , you want to see 2 meter whether running similar . you can setting the meter setting as 10kWh. The comparative energy=10kWh + WIFI meter running under detail menu display.

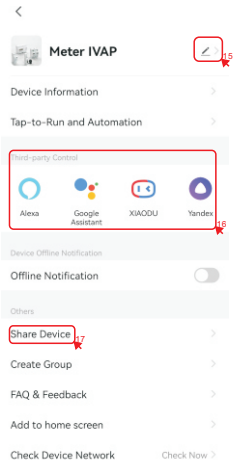
13.CO2 carbon emissions unit you can setting the index as 0.785 or according to your country real condition under setting menu.

14.Meter number means you can input 12 digits meter serial number.

3.13.3



3.14



15. You can change the meter name in here.
16. You can connect the meter with Intelligent voice sound and use Voice control on/off function .
17. You can share the equipment with other people who have installed the same APP .

Note: WIFI meter is only support 2.4GHz network , not support 5GHz network. If lose WIFI,you also can use your mobile phone bluetooth to connect automatically to contro l on/off meter and read data from APP when you near the meter.