User Manual
Revision 2.001
English

EM535 series

Three phase active energy meter

Shanghai fangqiu electric CO.,LTD.

Benefits and Main Features

- Three phase metering , Standard DIN rail Format (DIN43880)
- IEC62053-21 Class 1.0
- LCD display, 6 integer 1 decimal
- Large clear backlight display
- Internal transformer
- Direct metering up to 65A,transformer metering 1.5(6)A
- 27 CT rate can be selected
- Optional single-phase model
- Smart communication port, RS485&M-bus can selected
- Can be set through front panel or via communications
- Isolate pulse output (DIN43864)
- Memory back-up (EEprom)
- 5 DIN modules
- CE approval

Index:

1. Safety notice

The smart energy meter of EM535 series does not require special mechanical or electrical tools for its installation. Mounting position (with any angle of tilt) has no effect on the measurement functions of the meter.

Connecting of the meter must be made according to applicable wiring diagram. Incorrect connection of the meter to the electricity network causes major display problem and can also causes serious damage to the meter. Before starting meter operation, it must be ensured the local conditions of the energy system are consistent with data on the nameplate of the meter. Preferably use for the connection of shielded cables. Make sure that connecting cables are not damaged during installation of the meter are not energized and free of non-mechanical stress.

Repairs when removing the cover of the meter, which is also under tension can be made only by a qualified electrician who is familiar with the associated risks. Capacitors in the meter may still be charged even if the meter is disconnected from all energy sources.

2. Content of delivery

Three phase, electronic energy meter, instructions for assembly and operation

ID setting

Baud rate setting

CT rate setting

Password setting

3. Technical description

3.1 Survey of types/Ordering numbers

The EM535 series is labeled as follows:

EM535 . 3 . 1

- 1 → Communication type:
  - 1= pulse output:
  - 2 = Pulse output, IR &RS485
  - 3= Pulse output &M-bus
- 3 → Connect type:
  - 3= Directly connect
  - 4= Transformer connect

Ordering numbers	Connect type	Communication output
535.3.1	Directly connect	Pulse output
335.3.2	Directly connect	Pulse output, IR &RS485
535.3.3	Directly connect	Pulse output &M-bus
535.4.1	Transformer connect	Pulse output
535.4.2	Transformer connect	Pulse output, IR &RS485
535.4.3	Transformer connect	Pulse output &M-bus

3.2 Performance criteria

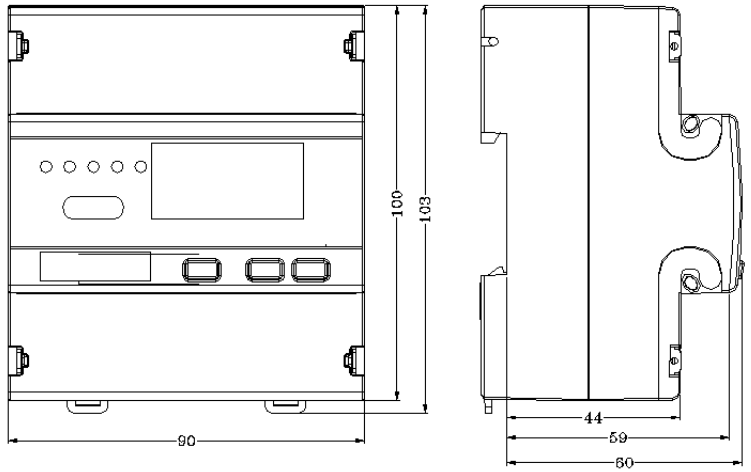
Operating humidity	≤ 75%
Storage humidity	≤ 95%
Operating temperature	-5°C - +45°C(3K5)
Storage temperature	-25°C - +55°C(3K6)
Humanity	75% yearly average,95% on 30 days/year
International standard	EN50470-3 &IEC62053-21
Accuracy class	CI.1
Protection against penetration of dust and water	IP51
Insulating encased meter protective class	II
Connection area main terminals	
Current terminals flexible 1×mm^2	0-10mm^2
another terminal flexible 1×mm^2	0-2.5mm^2

3.3 Meter specification

	Direct connected meters	Transformer connected meter
Voltage(v)	3×57.7/100V	3×57.7/100V
	3×220/380V	3×220/380V
	3×230/400V	3×230/400V
Operational voltage	±70%Un	±70%Un
Current(A)		
- Iref	5A	1.5
-Itr	0.5A	0.15A
-Imax	65A	6A
-Imin	0.25A	0.015A
-Ist	20mA	3mA

	Direct connected meters	Transformer connected meter
Power consumption of current circuits(VA)	< 0.01	< 0.01
Power consumption of voltage circuits(W)	< 1.3W	< 1.3W
General data		
Frequency (Hz)	50/60	50/60
Memory back-up	EEprom	EEprom
Environment resistance to heat and fire	Terminal 960℃ Cover 650℃	Terminal 960℃ Cover 650℃
Enclosure material		
upper	ABS+PC	ABS+PC
lower	ABS+PC	ABS+PC
Pulse output		
Pulse width(ms)	80	80
Pulse constant(imp/kWh)	400	1600
LED		
LED constant	400	1600
Dimension		
Width (mm)	90	90
Height (mm)	104.5	104.5
Depth (mm)	60	60

4. Dimensions and sealing points

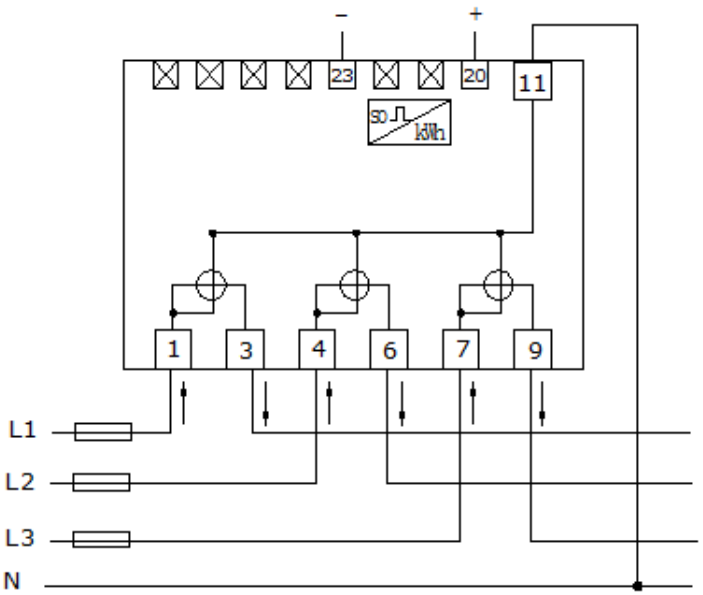


5. Wiring diagrams

Note: the following types of wiring diagrams show the energy meter, include terminals for pulse output and the communication interface RS-485.However,depending on the ordering number of the energy meter only some terminals of the energy meters are involved.

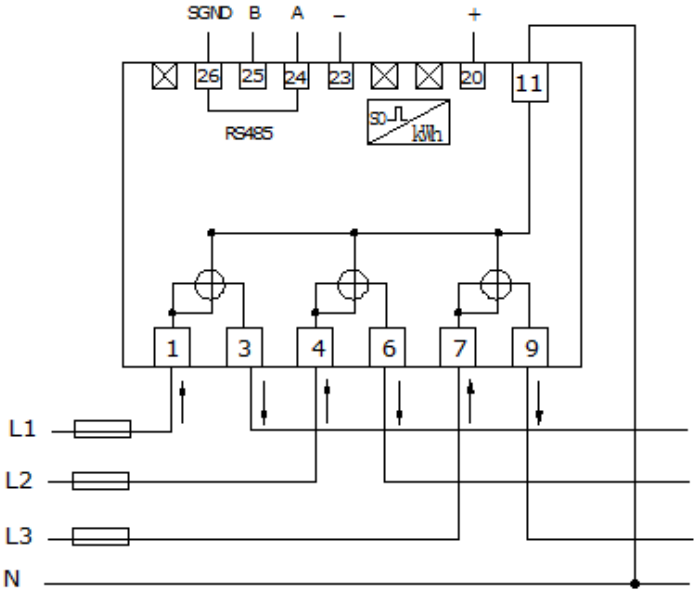
5.1 Direct connected meter

5.1.1 535.3.1 diagram



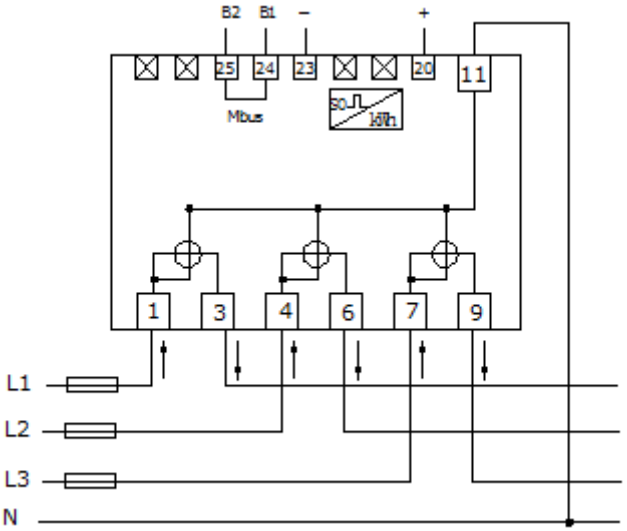
1/3	L1 in & out
4/6	L2 in & out
7/9	L3 in & out
11	Neutral
20 &23	kWh test pulse output contact (23－,20+)

5.1.2 535.3.2 diagram



1/3	L1 in & out
4/6	L2 in & out
7/9	L3 in & out
11	Neutral
20 &23	kWh test pulse output contact(23－,20+)
24&25	RS485 communication contact(25TX/RX(-), 24TX/RX(+))
26	RS485 GND

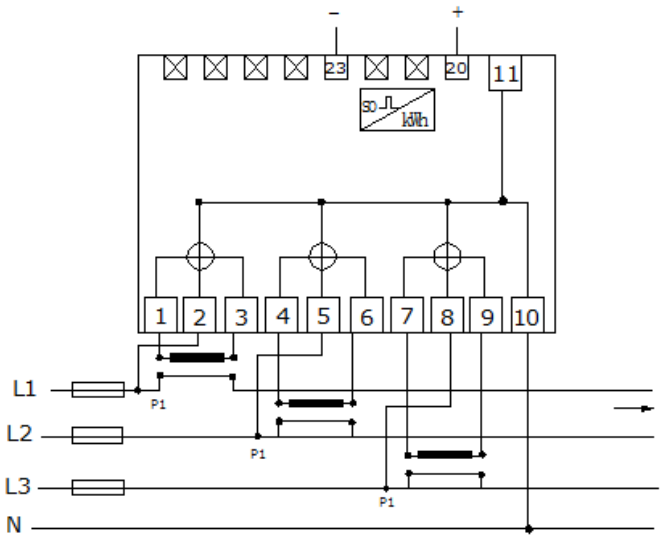
5.1.3 535.3.3 diagram



1/3	L1 in & out
4/6	L2 in & out
7/9	L3 in & out
11	Neutral
20 23	kWh test pulse output contact(23－,20+)
24&25	Mbus communication contact

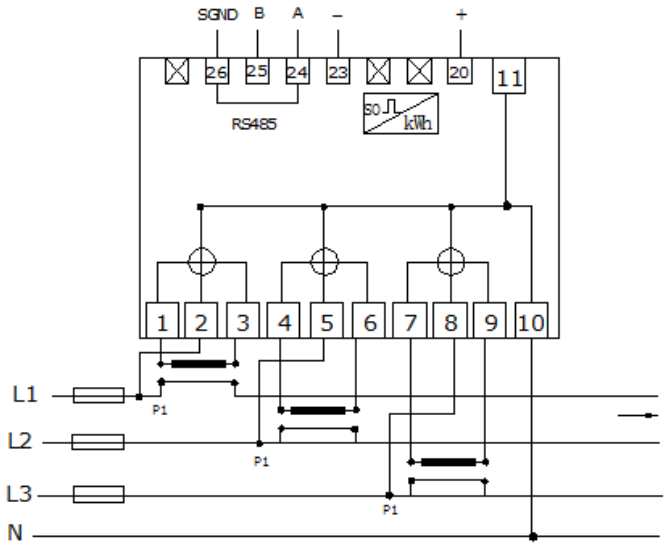
5.2 Transformer connected meter

5.2.1 535.4.1 diagram



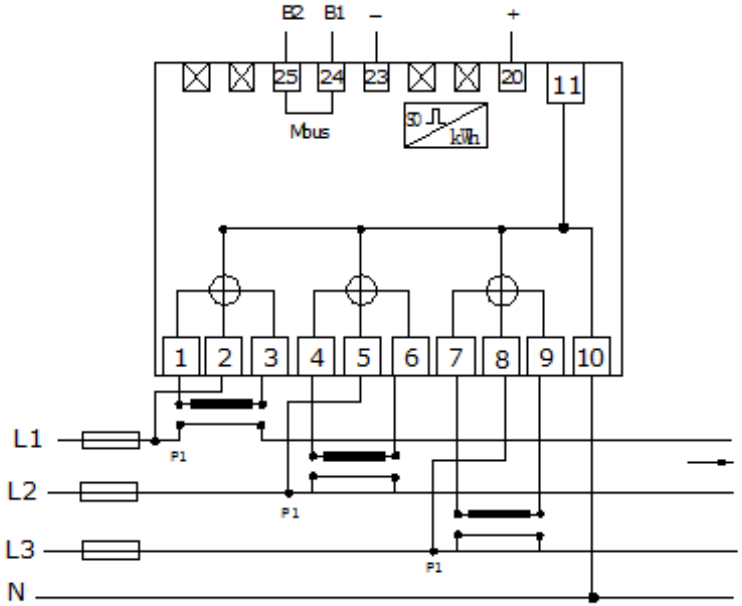
1/3	L1 in & out
4/6	L2 in & out
7/9	L3 in & out
2/5/8/10	UL1,UL2,UL3,N
20 &23	kWh test pulse output contact(23－,20+)

5.2.2 535.4.2 diagram



1/3	L1 in & out
4/6	L2 in & out
7/9	L3 in & out
2/5/8/10	UL1,UL2,UL3,N
20 &23	kWh test pulse output contact(23－,20+)
24&25	RS485 communication contact(25 TX/RX(-), 24TX/RX(+))
26	RS485 GND

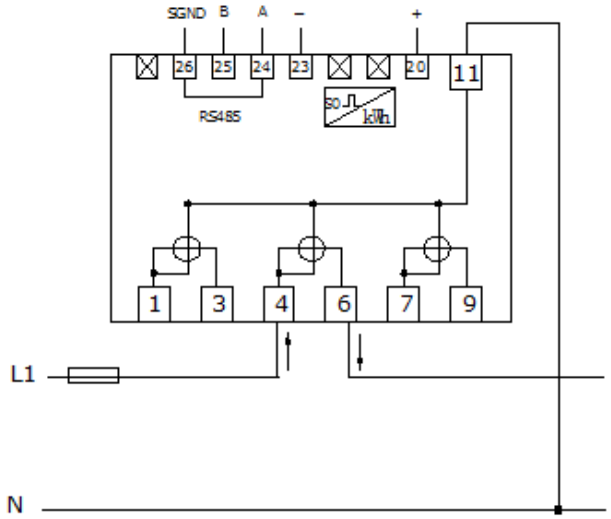
5.2.3 535.4.3 diagram



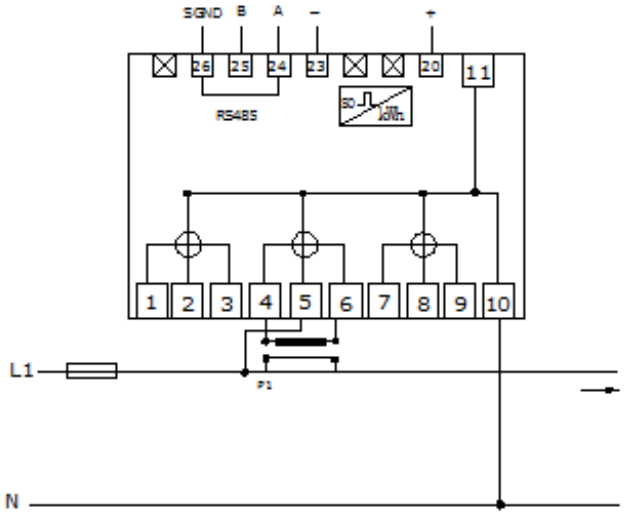
1/3	L1 in & out
4/6	L2 in & out
7/9	L3 in & out
2/5/8/10	UL1,UL2,UL3,N
20 &23	kWh test pulse output contact(23－,20+)
24&25	Mbus communication contact

5.3 single phase diagram

5.3.1 Direct connected meters

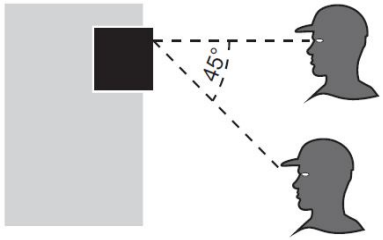


5.3.2 Transformer connected meter



6 Meter reading

the view angle Operator-meter should be up to 45^0



7 Meter operation

7.1 Consumption indication

On the EM535'S front panel, there are five LED, respectively, for the Active energy pulse light, current reverse ,Phase L1/L2/L3 . The constant of the impulse is shown on the

nameplate of the meter.

7.2 Reading the meter

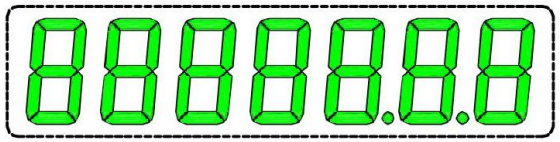
The smart energy meter is equipped with 6+1 LCD display, which is used as recording consumption and can't be reset to zero. The number system is based on units of 10. And unit is kWh. Another way through RS485 and PC software can read power consumption

Meters have four status: self-inspection status, cycle display status ,button press display and program status.

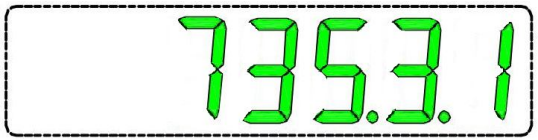
Self-inspection status：meters will come into self-inspection status after connect with electricity. include: full screen、software version number. every screen display time is 1 second.

Self-inspection status：

Full screen display：



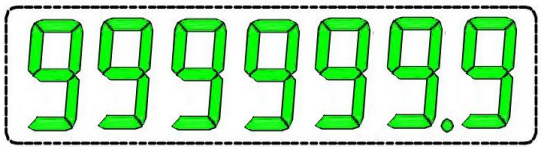
Meter version number：



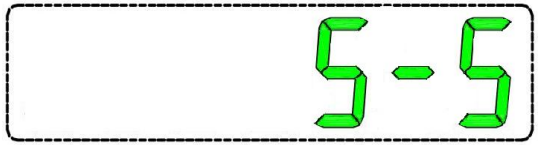
Cycle status：

Meter display as follows:

active energy:



CT rate:

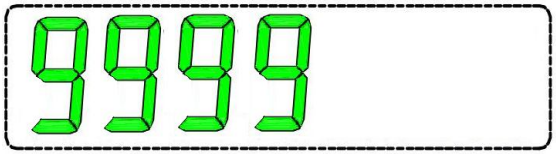


Button press display status:

Id:

Serial number (high 4 bit):

Serial number (low 4 bit):

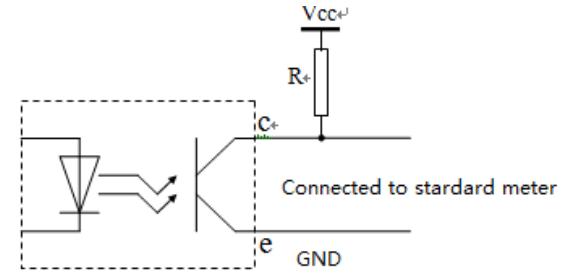


Baud rate:

7.3 Pulse output

Smart din rail energy meter is equipped with a pulse output which is fully separated from the inside circuit. That generates pulses in proportion to the measured energy. They are test pulse output (pins 20 & 23). Usually, the test pulse output is used as testing accuracy or reading purpose in close quarters.

The test pulse output is a polarity dependant, passive transistor output requiring an external voltage source for correct operation. For this external voltage source, the voltage (Ui) should be 5-27V DC, and the maximum input current (Imax) should be 27mA DC. To connect the impulse output, connect 5-27V DC to connector 23 (anode), and the signal wire (S) to connector 23 (cathode). The meter pulses is indicated on the front panel.



opto-coupler outpout into meter

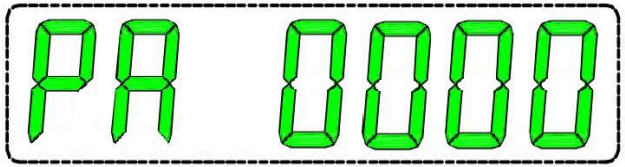
7.4 Communication port

Smart meter has equipped communication port, we can program the meter's operation data or reading via these 2 ports.(Pin26 pin27) . There are two options for the communication com，RS485 or M-bus.

	RS485 output	M- bus output
Protocol	Modbus RTU	EN13757-3,EN1434-3
Data format	8 data bit,Even,1 stop bit	8 data bit,Even,1 stop bit
Baud rate	1200(option),2400,4800,9600	300,2400(option),9600
Address range	1-256 User settable	1-250 User settable
Bus loading	64pcs	≤380m 250PCS ≤3600m 64PCS
Cable	AWG18	JYSTY （n×2×0.8）

8 Programming

By holding the keys "SET" pressed for at last 3 sec., starts menu programming mode.LCD will show:



8.1 password verify

On the smart meter display will appear : PA followed by the currently memorized value . "PA" means "Password","0000"means the 4 digits of the Password. we can use press "Page Down" button to decrease the input value, and press "Page Up" to increase the input value ,press the "SET" button to switch the input Password digits, when the Password is correct, the meter will enter "program status" and display the "ID" program interface.

Remarks:

Please remember well the Password, you can only reset the Password to default (8888) by opening the meter and short connect the "CLEAR" on PCB board.

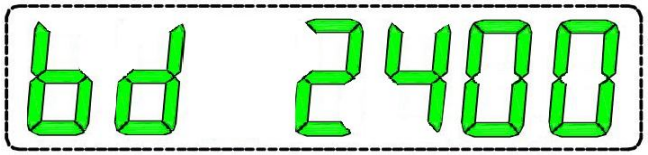
8.2 ID setting

After the Password authentication , the meter will display the "ID XX" setup interface. As the following picture "Id 00" it means the current ID address is 00 (the ID address is hex code)

Press "Page Down" button to decrease the digits. press "Page Up" to increase the digits， press "PRO" button to save the setup, the interface will switch to Baud rate setup interface automatically. Press "PRO" button to enter next interface if you do not need to change the baud rate.

Remark：Type 535.3.1&535.4.1 series meters without communication function do not have the setup interface

8.3 Baud rate setting

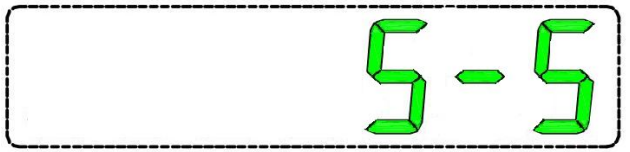


Press "Page down" and "page up" buttons to select the communication baud rate, press "PRO" button to save the setup.the interface will enter CT setup.

Remars：

1. Type 535.3.2 &535.4.2 series meters , default baud rate will be 1200bps
2. Type 535.3.3 &535.4.3 series meters , default baud rate will be 2400bps
3. 300bps /1200/2400bps /9600bps can be set
4. Type 535.3.1&535.4.1 series meters without communication function do not have the setup interface

8.4 CT rate setting



Press "Page down" and "page up" buttons to select the CT transformation ratio press "SET" button to save the setup. the interface will enter Password setup.

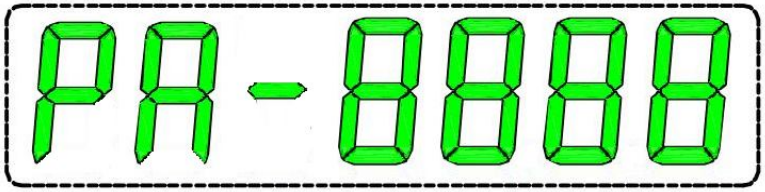
CT rate	5:5	5:50	5:60	5:75	5:100	5:125	5:150	5:160	5：200
	5:250	5:300	5:400	5:500	5:600	5:750	5:800	5:1000	5：1200
	5：1250	5：1500	5：2000	5：2400	5：2500	5:3000	5:4000	5:5000	5：6000
	5:7500								
Remark	When 5：5≤CT ratio＜ 200　　0000000.0≤ kWh≤9999999.9 CT ratio≥ 200　　00000000≤ kWh≤99999999								

Remark：

1,if the meter is Direct connection type, it has no CT setup interface.

2,after the CT ratio setup, the energy consumption display will be reset to 0.

- Password setting：



The meter will display the current password after enter the password setup interface, press the “SET” to change the password. Use “page dow” and “page up” button to input password as you want. After 30 seconds the meter will save the password you changed.

Remarks:

1 Do not forget the password you setup.

2 Please press the button to check if every setup is correct after the program.

3 Password setup interface “-“ symbol will blink.

9. Technical support

Any questions, please contact:

TEL:

FAX:

Email: antsmw@163.com