Single Phase Two Wires LoRaWAN Meter

EM114039-02 User Manual【M-20230914001】

Warnings

Important Safety Information is contained in the" Installation instructions" and "Safety instructions" section. Familiarize yourself with this information before attempting installation or other procedures.

Risk of Danger: These instructions contain important safety information. Read them before starting installation or servicing of the equipment.

Caution: Risk of Electric Shock

1. Brief Introduction

EM114039-02 is a single phase multifunction& din-rail mounted energy meter.
The meter supports optional prepaid and postpaid modes, supports TTL local communication, LoRaWAN remote communication and modbus protocol. With built-in latching relay, it can achieve local relay status setting through TTL communication and remote control relay on/off through LoRaWAN communication.At the same time, remote reading of energy meter can be achieved. This energy meter can be widely applicable to household and commercial distribution systems.

2. Main Functions

- Measure forward and reverse active energy, active power, voltage, current, frequency, power factor and other parameters
- Supports prepaid energy, prepaid credit, and post payment modes. The overdraft mode can be activated under the prepaid mode, to continue to use a certain amount of energy or credit when energy or credit is used up
- In prepayment mode, you can also set the unit price of energy for different energy consumption
- Witha built-in latching relay that can remotely control the meter's on-off.
- Support LoRaWAN remote communication, can remotely read data, and can also remotely control relay on/off.
- Supports overcurrent cutoff, overcurrent threshold and overcurrent cutoff recovery time can be set. According to the set overcurrent threshold and overcurrent cutoff recovery time, the relay automatically cuts off if the actual current exceeds the threshold value.After the set recovery time, the relay will automatically try to close three times. If the current returns below the threshold value, the relay is successfully closed.Instead, all three times the closing is unsuccessful, the relay stays disconnected and needs to be closed via the PC software
- LCD display, button page turning.
- Standard 2 module phase meter, standard rail installation

3. Technical Parameters

3.1 General Requirements

Voltage AC (Un)	230V
Current	5(80)A
Starting Current	0.4%Ib
Power Consumption	Voltage circuit<1W / <10VA Current circuit<1VA
Accuracy	Class 1

Frequency	50Hz
Pulse Output	1000 imp/kWh
LCD Display	LCD5+1=99999.9kWh
LoRaWAN Frequency band	EU863-870
Built-in Latching Relay	Ue 230V
Altitude Utilization	<2000m
Protection Level	IP51(Indoors use only)(only consider the front display)
Insulation class	Class II
Pulse voltage	6KV
Mounting Position	Wall or cabinet mounted
Standard Reference	IEC62052-11 & EN50470-3

3.2 Communication

(1)Support LoRaWAN communication, Modbus protocol, communication frequency EU868MHz.The energy meter can be remotely read by LoRaWAN, and the relay can be remotely controlled on and off.

(2)Support TTL communication, modbus protocol, communication default parameter:38400-8-N-1.

Used for local communication, can be used to read and set the parameters of the meter.

3.3Accuracy

Voltage	1%
Current	1%
Frequency	1%
Active Power	1%
Active Energy	1%

3.4 Environment

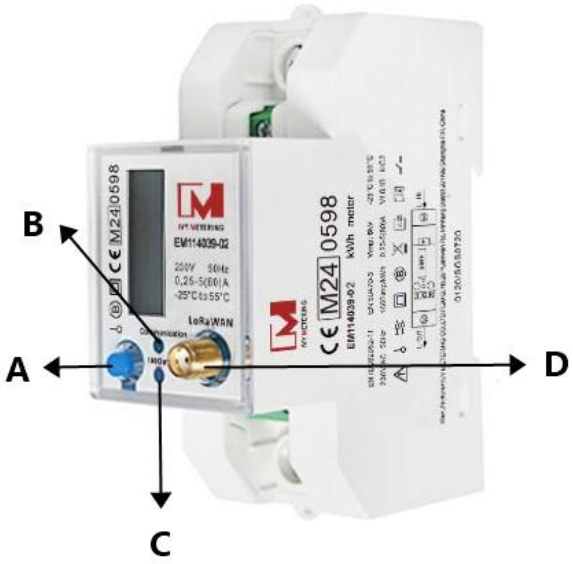
Working Temperature	-25~55℃
Storage & Transportation Temperature	-40~70℃
Reference Temperature	23 ± 2℃
Relative Humidity	≤75% (Non Condensing)
Preheating Time	10s
Vibration	10Hz to 50Hz,IEC 60068-2-6,2g

*Maximum operating and storage temperatures are in the context of typical daily and seasonal variataion.

3.5 Standard Measurement Conditions (reference conditions)

Ambient Temperature	23 ± 2℃
Frequency	50Hz ± 5%
Current	80A
Voltage	230V ± 5%

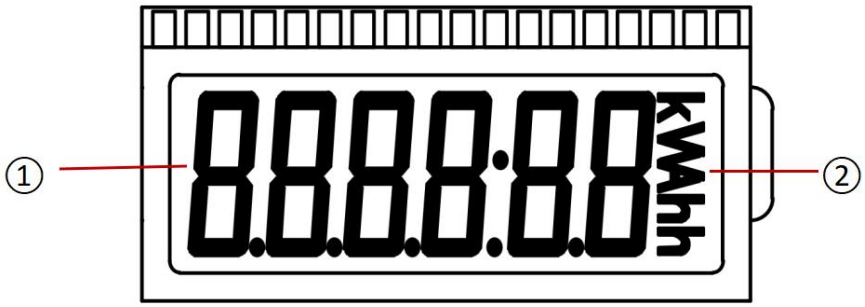
4. Product Appearance



A	Button
B	Communication indicator
C	LED pulse indicator
D	LoRaWAN antenna interface

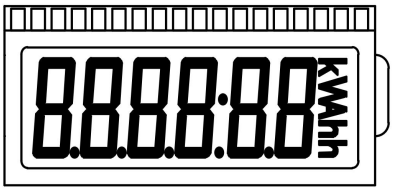
5. LCD Display

6.1 Full Display Introduction



①	6 digits display the measured values
②	Measuring unit

6.2 Startup Page Introduction

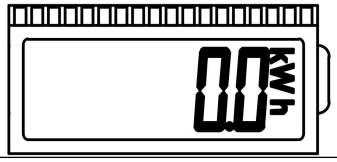
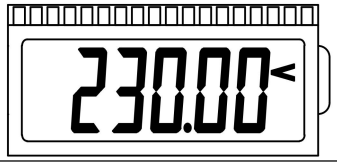
LCD Display	Meaning
	After power-on, about 1s to display the full display page; and then to display energy page.

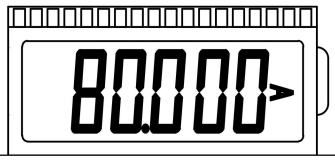
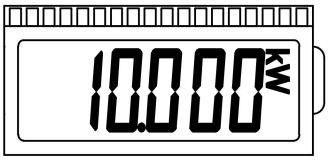
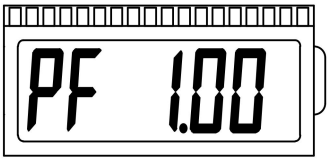
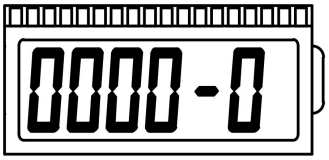
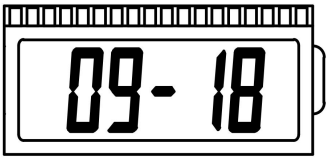
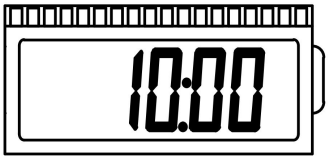
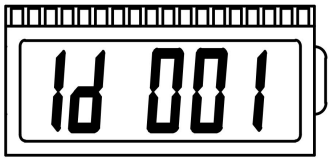
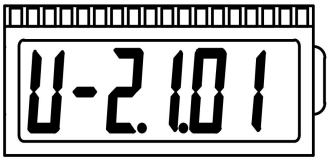
6.3 Button Function Introduction

Page turning can be done by button (no wheel display function)

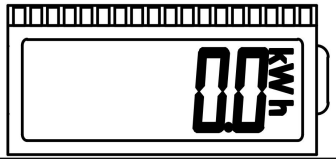
6.4 Pages Introduction

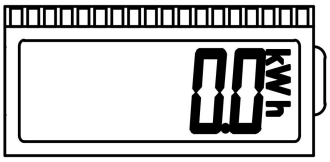
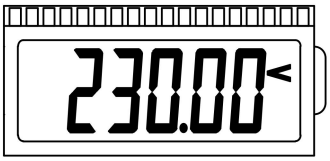
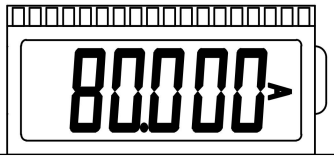
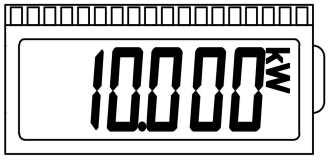
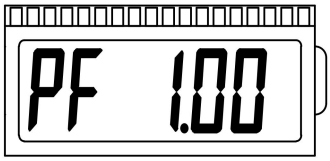
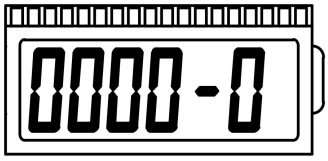
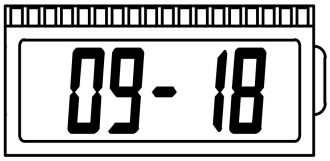
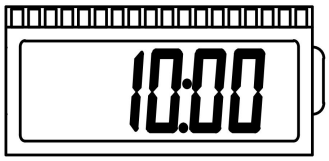
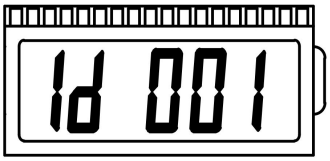
6.4.1 Postpaid mode display

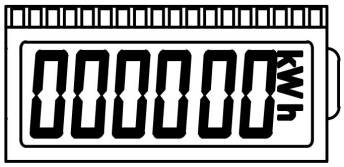
Number	LCD Display	Maximum Display	Description
1		5+1 00000.0kWh	Total energy
2		3+2 000.00V	Voltage

3		3+3 000.000A	Current
4		2+3 00.000kW	Power
5		1+2 0.00	Power Factor
6		0000-0000-0000-0000	DEVEUI（scroll display）
7			Date（MM-DD）
8			Time（Hh：mm）
9		Default 001	Modbus address
10			Software version number

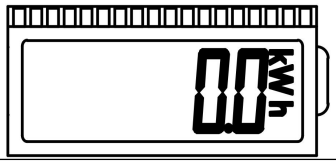
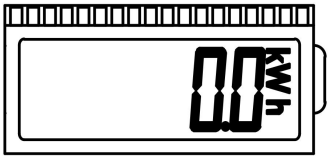
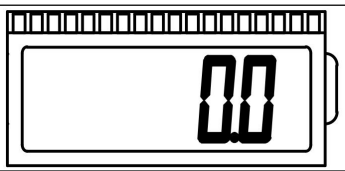
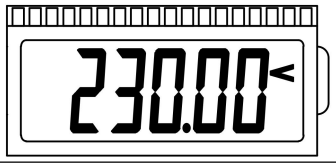
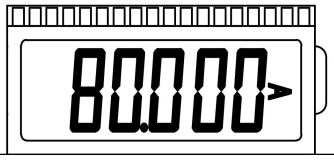
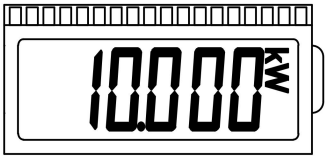
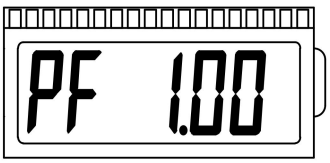
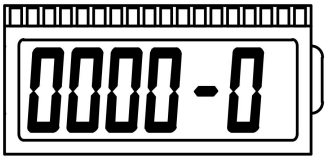
6.4.2 Energy prepaid mode display

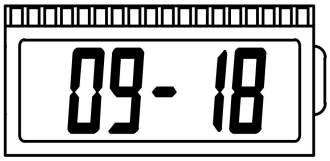
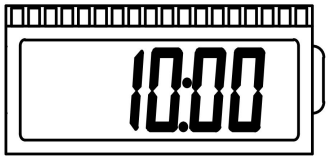
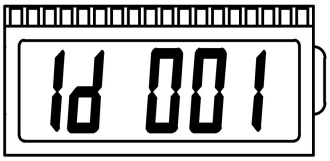
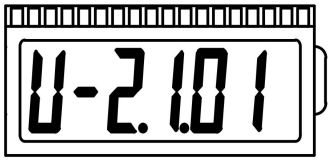
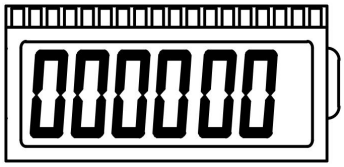
Number	LCD Display	Maximum Display	Meaning
1		5+1 00000.0kWh	Remaining energy

2		5+1 00000.0kWh	Total energy
3		3+2 000.00V	Voltage
4		3+3 000.000A	Current
5		2+3 00.000kW	Power
6		1+2 0.00	Power factor
7		0000-0000-0000-0000	DEVEUI（scroll display）
8			Date（MM-DD）
9			Time（Hh：mm）
10		Default 001	Modbus address
11			Software version number

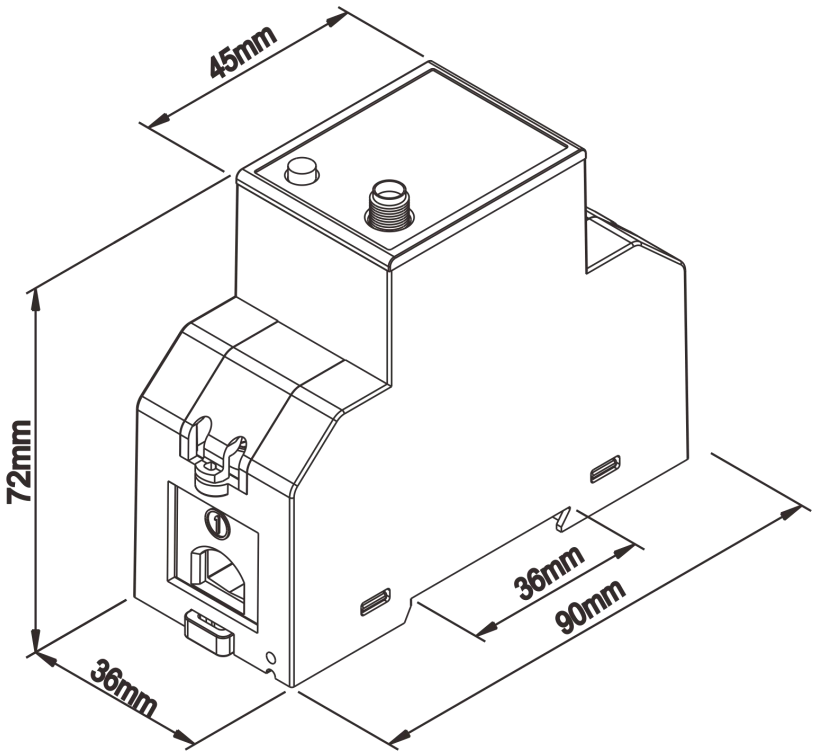
12		YYMMDD hhmmss 0000000.00kWh	Last recharge record(scroll display) Date,time,recharge energy

6.4.3 Credit prepaid mode display

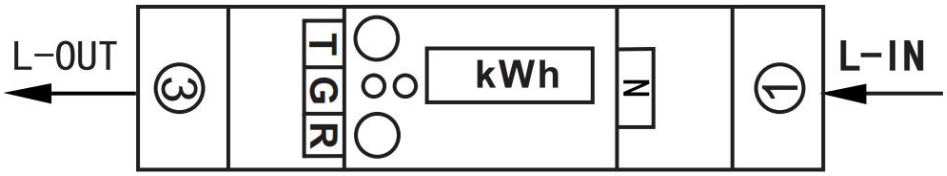
Number	LCD Display	Maximum Display	Meaning
1		5+1 00000.0	Remaining credit
2		5+1 00000.0kWh	Total energy
3		5+1 00000.0	Total credit
4		3+2 000.00V	Voltage
5		3+3 000.000A	Current
6		2+3 00.000kW	Power
7		1+2 0.00	Power factor
8		0000-0000-0000-000 0	DEVEUI（scroll display）

9			Date（MM-DD）
10			Time（Hh：mm）
11		Default 001	Modbus address
12			Software version number
13		YYMMDD hhmmss 0000000.00	Last recharge record(scroll display) Date, time, recharge credit

6. Overall Dimension



7. Wiring Diagram



Remarks:
1: Phase line-coming in
3: Phase line-coming out
N: Neutral line
T: TTL communication transmitter
G: GND
R: TTL communication receiving end

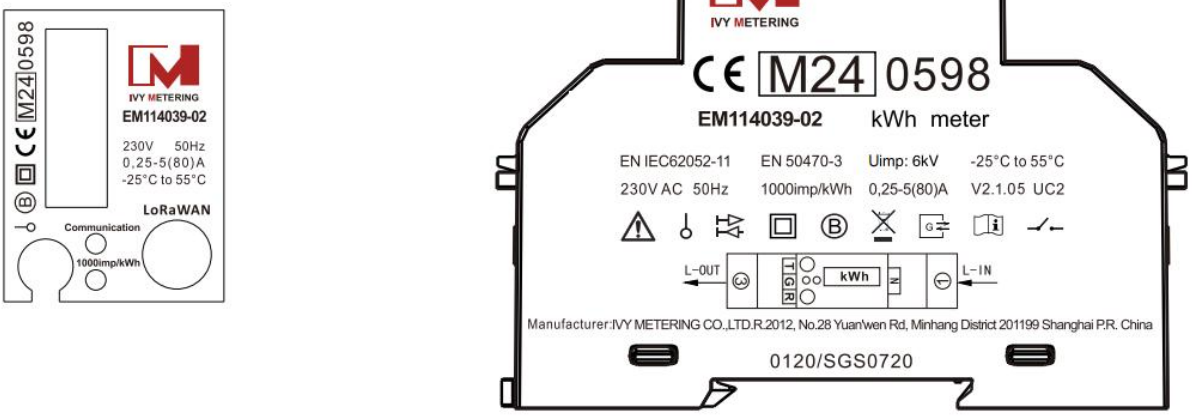
ATTENTION:
The TTL-USD communication line needs to be purchased by the customer,and the TTL terminal of the meter only allow 5V input,so the TTL-USB communication line must support 5V ouput.
TTL terminal must be fed as shown in the wiring diagram on the top.
Scrupulously respect instruction and the connection mode.

Terminals capacity(for your reference):

phase line: 1-25mm²(single core copper wire , withstand voltage 600V , temperature resistance 105℃)

neutral line and communication wire: 0.5-1.5mm²(single core copper wire , withstand voltage 300V, temperature resistance 125℃)

8. Nameplate



9. Antenna type(optional)

Type1:SMA sucker antenna
Type2:Glue stick antenna

SMA sucker antenna specification

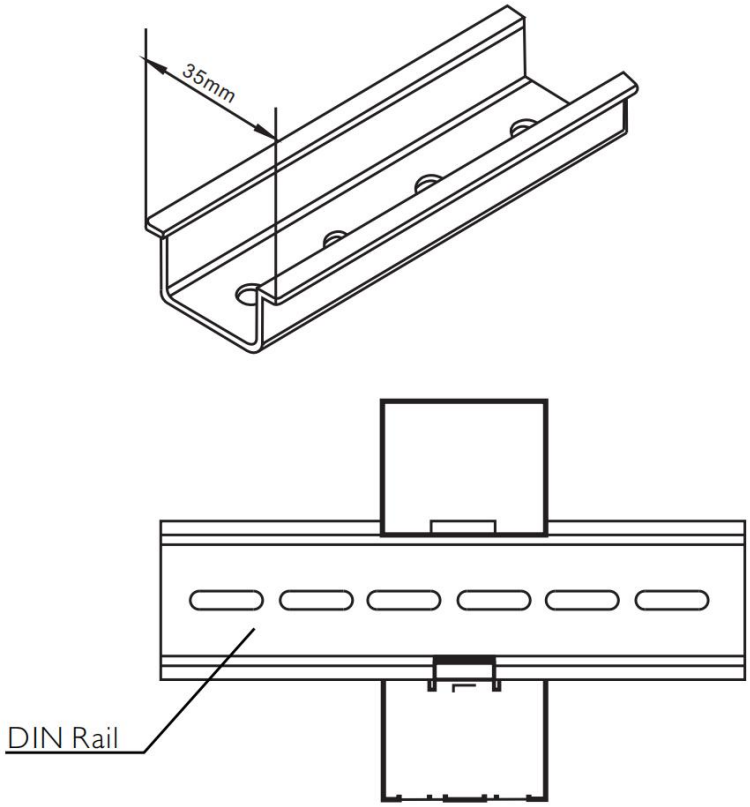
Main Technical Specifications	
Frequency Range(MHz)	824-960/1710-2170
VSWR	≤2.0
Gain(DBi)	5-7
Input Impedance(Ω)	50
Max input power(W)	50
Polarization Type	Vertical or Horizontal
Connector Type	SMA(Male pin)
Cable Type	RG174(64 Code)
Cable Length(mm)	2000
Antenna height(mm)	310
Base diameter(mm)	29.6

Glue stick antenna

Main Technical Specifications	
Frequency Range(MHz)	850-880
VSWR	≤2.0
Gain(DBi)	2
Input Impedance(Ω)	50
Max input power(W)	50
Polarization Type	Vertical or Horizontal
Connector Type	SMA(Male pin)
Antenna height(mm)	78+/-2

10. Installation Instructions

(1)Select 35mm standard din rails (customizable length) and fix them to the location where the meter is to be installed.
(2)Place the meter into the rail bar and press the clips to the bottom of the meter
(3)The meter should be installed in a ventilated and dry place to ensure the safety and reliability of the meter. In dirty or dangerous place, the meter should be installed in a protective box.
(4)The energy meter or energy meter box should be fixed on a solid, fire-resistant and stable bracket.
(5)There should be protective device at the front end of the meter to ensure that the maximum current of supply side not more than meter's maximum current, if the direct connected meter with SGS also not more than contactor’s maximum current according to UC category.
(6)Before installation, please check whether the meter has been damaged during transportation (damage to meter cover, hook, seal, LCD display, etc.)
(7)Since the interior of the energy meter is composed of sophisticated electronic components, it should be carefully protected during installation to avoid damage to the energy meter.
(8)The meter is intended to be installed in a Mechanical Environment"M1", withShock and Vibrations of low significance, as per 2014/32/EU Directive.
(9)The meter is intended to be installed in Electromagnetic Environment"E2", as per 2014/32/EU Directive.



11. Safety Instructions

For your safety, please read the following information:
This manual does not contain all safety measures for the operation of this energy meter, as special operating conditions, local code requirements or local regulations may require further measures. However, for your personal safety and to avoid damage to the energy meter, this manual contains important information that is highlighted by a warning triangle with an exclamation point or lightning bolt, depending on the severity of the warning.

Warning

Before installing the meter, make sure the power supply has been cut off, otherwise it will be life-threatening. The circuit breaker should be disconnected and placed in a safe place to avoid accidental power-on.

Compliance Operator

The installation and operation of the meter described in this manual can only be performed by qualified personnel.
Only personnel who are authorized to install, connect and use this meter, have relevant

knowledge of electrical equipment, circuit labels and grounding, and can operate in accordance with safety regulations and standards can be considered as qualified personnel as specified in this manual.

Exemption Liability

We have checked the contents of this manual and have made every effort to ensure that the description is as accurate as possible, but deviations of the product from the description cannot be completely excluded and avoided. Therefore, we do not assume any liability for any errors or omissions in the information provided. The data in this manuel will be checked regularly and the manuel version will be updated if necessary.

Other clarifications

After unpacking the meter, make sure the meter is intact. If in doubt, do not use the meter immediately, and contact the relevant IVY technician.
If the meter malfunctions, disconnect the meter immediately. If repair is required, please contact IVY technical support.
Failure to comply with the above may jeopardize the safety of the equipment.

12. Transportation & Storage

- The energy meter shall not be subject to severe impact during transportation and storage, and shall be transported and stoned in accordance with GB13384-2008.
- The energy meter should be kept in the original package, and the temperature range of the environment of the place where it is kept is -40~70℃, the relative humidity does not exceed 75%, and there is no corrosive gas in the air;
- The energy meters shall be stored in the warehouse and placed on the bench. The stacking height shall not exceed 10 boxes. After unpacking, the stacking height of single packaged energy meters shall not exceed 5 layers.

13. Quality Assurance

12.1Calculation method of warranty period:
Warranty is handled according to the commercial invoice issued by our company, and the time is 18 months from the date when the meter is shipped from the warehouse, minus the maintenance time and delivery time for no spare parts.

12.2 Warranty coverage
12.2.1 When the user fully follows up the transportation, storage, installation and application of the electric energy meter, and the company's conditions of sealing integrity (in the case of no printing and dis-assembly), the electric energy meter that does not meet the

quality requirements and valid evidence (For example, desks, certificate photos, feedback documents from customers' local users, relevant government departments, documents, etc.) should be provided by the customer.

12.2.2 We will repair, replace or return the meter in the following cases:

- No demonstration and no prior explanation
- Does not meet the implementation standards indicated on the product or its packing;(If the standard on the product/package is required by the customer, but does not meet the company's product implementation standard, the customer should make a corresponding responsibility commitment).
- Does not meet the quality status indicated by product instructions physical samples,etc.

Unqualified meters should be determined in consultation with the user. Generally, we will repair or replenish in the next order. Special circumstances shall be determined through consultation between the two parties.

Note: The quality guarantee is not applicable. If there is no valid invoice, the evidence corresponding to the quality problem of the order cannot be provided, and

the damage caused by force majeure or the warranty beyond the validity period, but can be recovered for repair (transportation and other related costs need to be borne by the customer)

14. Technical Support

Users' manual is mainly used to guide users to better utilize this series of meter. If unclear please contact with us at any time, we will give you a satisfactory answer.

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