

KPM 312
Three phase multi channel power meter instruction V1.0

Danger and Warning

- The device can only be installed by professionals.
- The manufacturer will not take responsibility for failures caused by non-compliant operation not following this manual.

Electric shock burning and explosion

- Device should only be installed and maintained by qualified personnel.
- Before carrying out any operation on the device, isolate the voltage input and power supply, and short-circuit the secondary windings of all current transformers.
- Confirm that the voltage has been cut off before operation.
- All mechanical parts and covers, etc. should be restored to their original positions before the device is powered up.
- The device should be supplied with the correct rated voltage during use.

1. Technical Parameters

1.1 Environmental conditions

Operating temperature: -25℃ ~ +70℃ Storage temperature: -30℃ ~ +75℃
Relative humidity: 5% ~ 95% No condensation Altitude :3000 meters below

1.2 Rated parameters

- Measuring range: Phase voltage L-N: 85~260VAC
Current: 0~800A(Depend on CTs)
Frequency: 45~65Hz
- Power consumption AC voltage loop: <0.5VA / phase (rated)
AC current loop: < 0.75VA / phase (5A)
Device power supply circuit: <3VA

Overload capacity

- AC voltage loop 1.2 times rated voltage, continuous operation.
2 times rated voltage, allow 10S.
- AC current loop 1.2 times rated current, continuous operation.
20 times rated voltage, Allow 1S.

Rated voltage: 3*220VAC

- Rated current: 4 channels optional : 5A, 100A, 400A, 800A,
with split core current transformers

Precision index

Parameter	Accuracy	Parameter	Accuracy
Voltage	±0.5%	Active power	Class 1
Current	±0.5%	Reactive power	Class 2

1.3. Electrical insulation performance

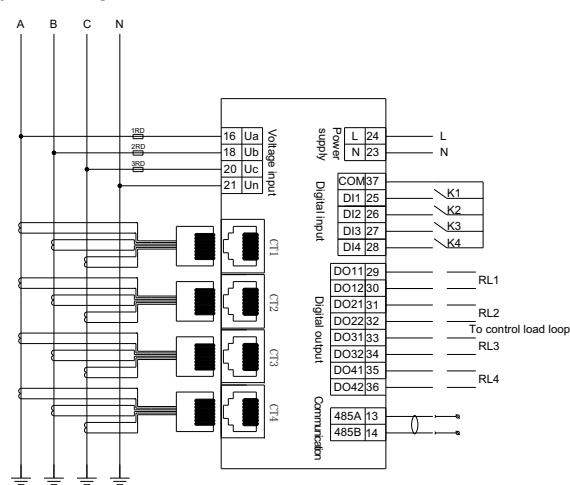
Power frequency withstand voltage:

Comply with GB/T13729-2002, Power frequency voltage 2KV,
Insulation resistance 1 minute.

2.4 Typical wiring

KPM312 provides star system wiring, the common wiring mode is as follows:

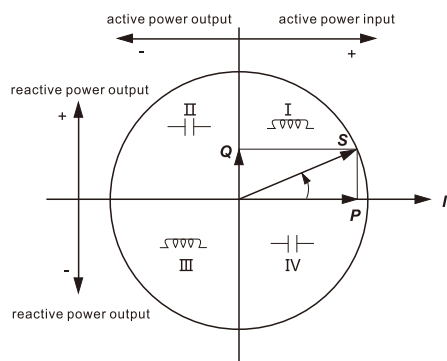
Star system wiring



3. Function Description

3.1 Power symbol

KPM312 provides bidirectional power calculation, power and power factor polarity as shown in the figure.



3.2. Power measurement

- Measure the import and export total active and total reactive energy of the 4 circuits, and calculate the sum of import and export bidirectional power and net import and export power.
- Multi-rate energy statistics: 4 rates, 4 time zones, and 24 time periods can be set.
- Recent 12-month history of import and export total active power, total reactive power and multi-rate power statistics.
- Class 1.0 accuracy for active power and Class 2.0 for reactive power.

Insulation resistance: Comply with GB / T13729-2002, Insulation resistance ≥50MΩ

Impulse voltage: Comply with GB / T13729-2002, withstand the impact of 1.2 / 50US, 5KV peak standard lightning.

1.4. Mechanical properties

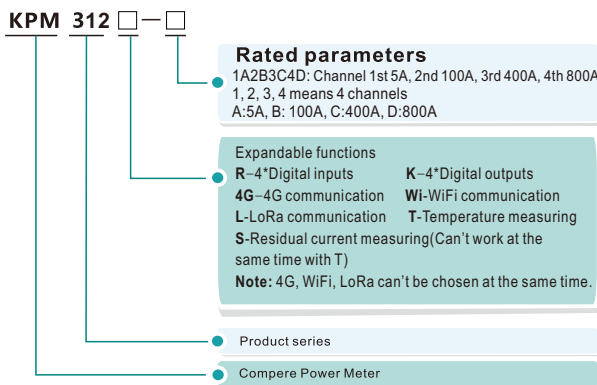
- Vibration response:** IEC255-21-1:1998, level 1
- Vibration durability:** IEC255-21-1:1998, level 1
- Impact response:** IEC 255-21-2, level 1
- Impact durability:** IEC 255-21-2, level 1
- Collision:** IEC 255-21-2, level 1

1.5. EMC performance

- Electrostatic discharge immunity:** IEC61000-4-2, level 4
- Fast pulse group immunity:** IEC61000-4-4, level 4
- Surge immunity:** IEC61000-4-5, level 4
- Power frequency magnetic field immunity:** IEC61000-4-8, level 4

2. Installation and wiring

2.1. Selection criteria



Note: The rated current is divided into four levels: A, B, C, D.

A for primary 5A, B for primary 100A, C for primary 400A, and D for primary 800A. Each channel can be worked with different current level.

Users can choose 1-4 channels as their needs.

For example, 1A2A means channel 1 and 2 rated current is 5A respectively, channel 3 and 4 are not chosen, the default is 5A.

Basic functions:

Three phase voltage, 4 channel three phase currents, active power, reactive power, apparent power, active and reactive energy, power factor, frequency, 2-31st harmonic content, max & min value statistics, voltage and current imbalance rate, total power demand statistics, multi tariff power and historical power consumption statistics, load and operation time statistics, optional 4 wires temperature measurements and 4 wire digital inputs and outputs.

3.3. Wireless communication

Lora : Working frequency band is: 410~525Mhz (default frequency 475.5Mhz). The theoretical transmission distance is 3.5km. This function needs to be paired with Compere Lora receiver module. Before use, please set two modules on the same channel and in transparent transmission mode. Lora communication adopts Modbus-RTU protocol, default baud rate is 9600 bps with no parity.

4G : Only works in client mode. MQTT and Modbus-RTU transparent protocol can be used to communicate with master. Need to set the master IP, port, MQTT account and password by Touch Energy.

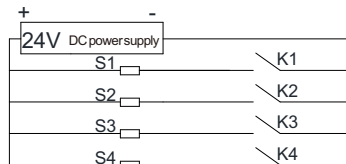
WiFi: Only works in client mode. MQTT and Modbus-RTU transparent protocol can be used to communicate with master. Need to set the master IP, port, MQTT account, password WIFI name and password by Touch Energy. Only support 2.4G WiFi

3.4. Digital input

KPM312 provides 4-channel digital input, used to detect the circuit breaker position signal, switch position signal and other status information.

DC24V power supply is provided inside the equipment, when the scene requires a switch input function, external access passive contact signal, when the external contact closed, the corresponding digital input state is also turned on.

Note: Terminal 37-40 is the digital input public terminals. Users can connect any of them.



3.5. Relay output

KPM312 provides 4 relay outputs and 2 action modes. The user should identify whether the relay is in remote control or over limit alarm control. In different control modes, the relays operate in different ways.

Remote control:

The relay is controlled by commands from the PC or PLC via communication.

Over limit alarm control:

The relay is controlled by an electrical parameter inside the device as a response to a set value control alarm condition.

The 2 relays operate as follows:

Remote control:

The relay closes by accepting a PC or PLC command. The relay status will remain until the PC or PLC issues a release command or the meter loses power.

Over limit alarm control:

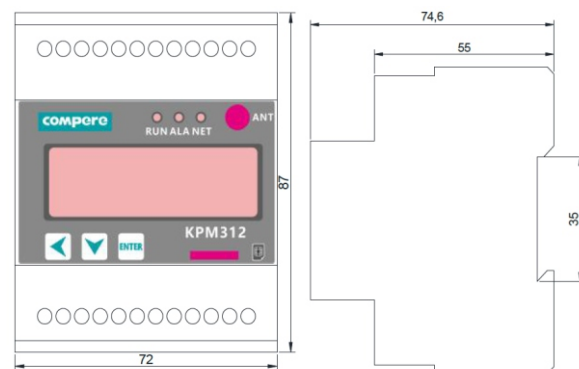
When the trigger relay's alarm signal is generated, the relay operates. The relay will not release until all the alarm conditions for the trigger relay disappeared or the meter has lost power. If the meter resumes power and the alarm condition still exists, the relay will act again.

Note: The mode setting of the relay needs to use KPM312 setting software to set through Rs485.

3.6 Temperature measurement

Optional 4-wire temperature measurement, using a 10kΩ NTC temperature sensor with an accuracy of 1%. The 4-wire temperature corresponds to the temperature measurement of 4 channels by default.

2.2 Shape and opening size



Note: Standard DIN 35mm rail installation

2.3 Terminals

2.3.1 Current sampling terminals

From left to right, 1st loop (CT1), 2nd loop (CT2), 3rd loop (CT3), and 4th loop (CT4).

2.3.2 Indication of voltage power supply terminals

13	14	15	16	17	18	19	20	21	22	23	24
A	B	NC	Ua	NC	Ub	NC	Uc	Un	Nc	N	L

2.3.3 Temperature terminals and DI public terminals

37	38	39	40	41	42	43	44	45	46	47	48
COM	COM	COM	COM	T4-	T4+	T3-	T3+	T2-	T2+	T1-	T1+

2.3.4 DI & DO terminals

25	26	27	28	29	30	31	32	33	34	35	36
DI1	DI2	DI3	DI4		DO1		DO2		DO3		DO4

2.3.5 Terminals definition

Index	Mark	Define	Index	Mark	Define	Index	Mark	Define
1	A	RS485 A +	25	DI 1	Digital input 1	37	COM	DI public terminal
2	B	RS485 B -	26	DI 2	Digital input 2	38	COM	DI public terminal
3	NC	Spare	27	DI 3	Digital input 3	39	COM	DI public terminal
4	Ua	Phase A voltage	28	DI 4	Digital input 4	40	COM	DI public terminal
5	NC	Spare	29			41	T4-	Temperature 4 input -
6	Ub	Phase B voltage	30	DO 1	Digital output 1	42	T4+	Temperature 4 input +
7	NC	Spare	31			43	T3-	Temperature 3 input -
8	Uc	Phase C voltage	32	DO 2	Digital output 2	44	T3+	Temperature 3 input +
9	UN	Voltage neutral wire	33	DO 3	Digital output 3	45	T2-	Temperature 2 input -
10	NC	Spare	34			46	T2+	Temperature 2 input +
11	N	Working power out -	35	DO 4	Digital output 4	47	T1-	Temperature 1 input -
12	L	Working power in +	36			48	T1+	Temperature 1 input +

4. Operating instructions

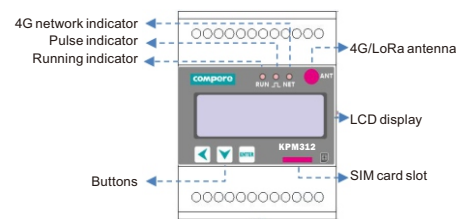
4.1. Interface display



Index	Display content	Detailed Description
1	Menu indication	Includes set, RT (running time), LT (Loading time)
2	Measurement data display area	Display main measurement data: voltage, current, power, power factor, energy, frequency, parameter settings, etc.
3	Communication indication	The two small computers all disappeared, indicating no communication. Two small computers all show that the communication is normally received and sent.
4	Time indication	Display time or time statistics
5	Electrical energy type	Display: Imp (import power) Exp (Export power) Tot (Total power)
6	Unit symbol	Voltage V, kV; Current: A, kA; Active power: W, kW; Reactive power var, kvar; apparent power: VA, kVA.

4.2 Operations

There are 3 touch operation buttons on the panel. These 3 buttons are labeled as Left key, Down key, and Enter key from left to right. The display of different measurement data and the setting of parameters can be realized by the operation of the three buttons.

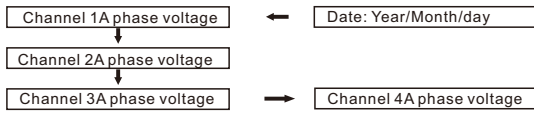


Note: The ANT antenna hole is only displayed when the 4G and LoRa functions are open, and the SIM card slot is only displayed when it has 4G function

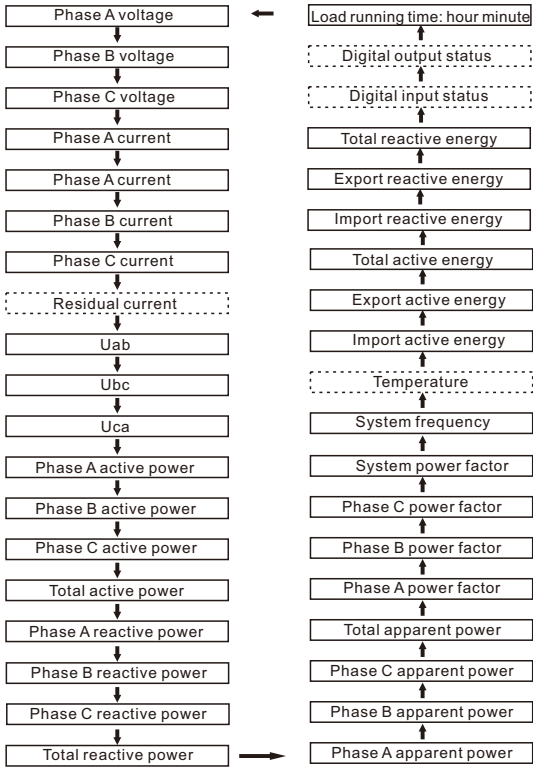
Name of key	Functional description
Left key	Switching power parameters display. If it is in the parameter setting state, it is used to move the bit to be modified
Down key	Switching power parameters display. If it is in the parameter setting state, it is used to increase the parameter values
Enter key	In the power parameter measuring state, it is used to enter the parameter setting interface. In the parameter setting state, it is used to enter the parameter setting state and confirm the parameter setting.
Left key + Enter key	Exit parameter setting state



In the electric parameter measuring state, press the **◀** key to switch to display the content as shown below.

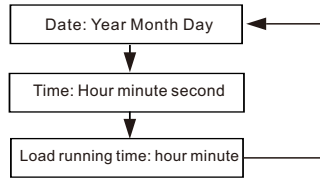


In the voltage measurement page, press the **▼** button to switch the display of electrical parameters in one loop, as shown in the figure below. Functions enclosed by dotted lines are available only when selected.



Parameter measurement pages

In the date interface, press the **▼** button to display the data as shown in the following figure in turn.



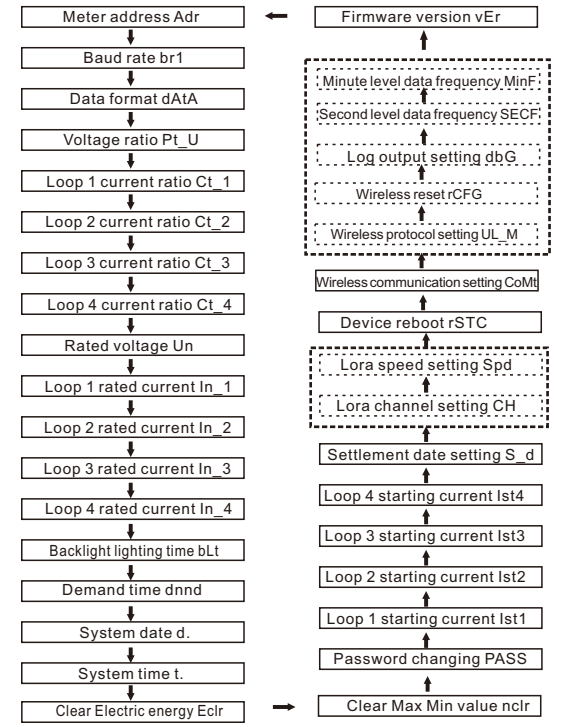
Date time query page

Press the **ENTER** key in the parameter measurement interface to enter the password input interface. The default password is 6666. After the password is entered, press the **ENTER** key to confirm. If the input is correct, it will enter the parameter setting interface. If the input error, it will return to the measurement parameter display interface. In the parameter setting interface, Press **▼** button to switch the parameter to be modified. Press **ENTER** button can enter the modification state of the parameter value, and it is accompanied by the flashing of the modified character. Meanwhile, you can change the parameter value by the **▼** button. After the modification, press the **ENTER** button to confirm, you can modify the next parameters. You can also press the **◀** and **▼** key to exit the modification state and return to the measurement interface.

When the user does not have any operation within 60 seconds in the parameter modification state, it will automatically return to the power parameter measurement display interface.

Parameter	Display	Default	Meaning
Communication Address	Adr	1	Modbus communication address 1-247. Default is loop 1: 1, loop2: 2, loop3:3, loop 4:4
Baud rate	br1	9600	Communication baud rate 1200-38400bps
Parity	dAtA	81n	81n: no parity. 81E: Even parity. 81o: odd parity.
Voltage ratio	Pt_U	1	Voltage transformer ratio 1-9999
Loop 1 Current ratio	Ct_U	1	Current transformer ratio 1-9999
Loop 2 Current ratio	Ct_U	1	Current transformer ratio 1-9999
Loop 3 Current ratio	Ct_U	1	Current transformer ratio 1-9999
Loop 4 Current ratio	Ct_U	1	Current transformer ratio 1-9999
LCD lighting time	bLt	1	Unit: minutes (0-120). 0 means the backlight will never go out
Demand time	dnnd.	5	Unit: minutes (0-120). Time window width in sliding window demand calculations
System data	d.	Date	Eg: 2022.08.05
System time	t.	Time	Eg: 12:00:00
Clear energy data	Eclr	Cleared	Used to clear the consumption data.
Clear max/min value	nclr	Cleared	Used to clear the max&min value.
Password modification	PASS	6666	Default password 6666
Loop 1 starting current	Ist1	20	Unit mA
Loop 2 starting current	Ist2	20	Unit mA
Loop 3 Starting current	Ist3	20	Unit mA
Loop 4 Starting current	Ist4	20	Unit mA
Forzen date setting	S_d	1	01-28

Parameter	Display	Default	Meaning
Lora channel setting	CH	4755	4100-5250
Lora speed setting	Spd	09	07-12
Reboot	rSTC	no	Device reboot
Wireless communication setting	CoMt	LorA	0-Lora, 1-WiFi, 2-4G
Wireless protocol setting	UL_M	Mqtt	0-Mqtt, 1-_toU (transparent)
Wireless reset	rCFG	No	Reset information in WIFI/4G mode
Log output	dbG	No	"YES" for log output by RS485 in WIFI/4G mode
Second level data upload frequency	SECF	30	30, 60, 300, 900, 1200, 1800, 3600s
Minute level data upload frequency	MinF	05	01, 05, 10, 15, 20, 30, 60mins
Firmware version		AV1.0202206	



Setting interface

Wireless setting part will only be displayed in WIFI or 4G mode. Lora setting part will only be displayed in Lora Mode.

5. Communication

5.1 RS485 communication

KPM312 provides MODBUS-RTU communication protocol through RS485 port, with 1 start bit, 8-bit data bits, 1/0 odd even parity bit, 1 stop bits. Each byte length is 11 bits. Supported baud rates: 1200, 2400, 4800, 9600, 19200, 38400 bps. Default communication parameters: Modbus RTU protocol, 9600bps, no parity.

The format of the data frame is as follows:

Address field + Command field + Data field + CRC check area

Please contact supplier for KPM312 Modbus-RTU protocol for more details.

Note: The address displayed and set on the interface is the address of loop 1, and the addresses of loop 2 to 4 are incremented by 1 on the basis of the address of loop 1. During use, devices on the same bus need to be set every 4 addresses.

5.2 Wireless communication

KPM312 has optional LoRa wireless point-to-point transparent transmission communication, WIFI wireless communication, and 4G wireless communication. Only one of the three can be used.

Through the device settings interface "CoMt" (wireless communication setting) to select.

1. LoRa

Can be set through the interface of the device, mainly to set the channel (4100~5250), communication speed (07~12).

LoRa communication adopts Modbus-RTU protocol.

2. WiFi/4G

KPM312 supports optional WIFI/4G wireless communication. The protocol can be selected between MODBUS RTU transparent or MQTT. The protocol can be set in wireless protocol setting (UL_M). Both of them needs to be set in Touch Energy APP. Specific configuration steps are as follows:

Step 1: Set the meter to debug mode

Enter the setting interface, press **◀** key or **▼** key to enter the rCFG page and set it to "YES".

rCFG: YES

Press the **ENTER** key, the position of "no" will flash, press **◀**, it will be changed to "YES" status, and then press **ENTER** key.

Note: The system only stays in YES status for a few seconds then it will go back to NO. Once u changed to YES status and pressed **ENTER** key, the reconfigure step is finished.

At this time, the device will connect to the Compere maintenance platform. Then use the Touch Energy APP to configure.

Note: If it is WIFI wireless communication, you need to turn on the mobile hotspot and set the account to **compere-debug** and the password to **kpmdebug**. Then the device will connect to the default hotspot and connect to the Compere maintenance platform for configuration.

Step 2: 'Touch Energy' APP meter setting

1. Download 'Touch Energy' from Google play or Apple APP store.
2. Click 'Meter setting' to enter the code search page. As Fig 1.

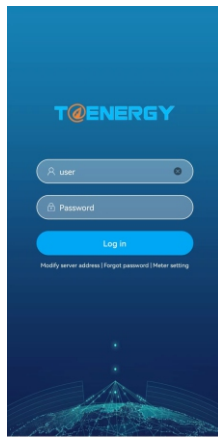


Fig 1

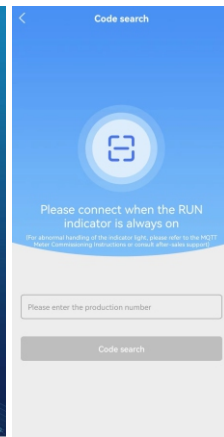


Fig 2

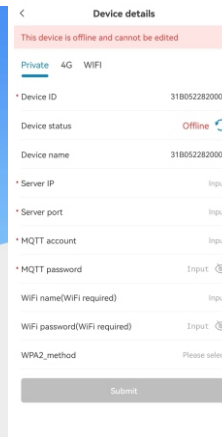


Fig 3

Step 3: Search for devices: As Fig 2

Input the production number to search

If the number is wrong, the search button will be grayed and cannot be clicked.

If the number is correct, click the "code search" button to identify the device.

Note: The default device ID/Production number is for loop 1. This ID is used for configuration and connection to the server. The device IDs of loops 2 to 4 are incremented by 1. When uploading data, each loop uses its own ID.

Step 4. Input the configuration parameters and submit:

As Fig 3.

After entered the device details page, click refresh button in Device status until it's online.

4.1 Private server settings

This page is for the meters sending data to the customers to private server. Input private server address (support domain name and IP address), server port, MQTT account, MQTT password, etc.

If using WIFI meter, the local WIFI name and Password are required. WPA2 for enterprise level WIFI can be set too.

If using 4G meter, the WIFI name and Password is not required.

4.2 4G communication setting

Input server address (support domain name and IP address), port, MQTT account, MQTT password and submit. The default information is for sending data to T@ENERGY cloud platform.

4.3 WIFI communication setting

Input server address (support domain name and IP address), port, MQTT account, MQTT password, local WiFi name and password (WPA2 for enterprise level WIFI can be set too) and submit. The default information is for sending data to T@ENERGY cloud platform.

Step 5: Wait for about 20 seconds for the meter to return status information. If the configuration is successful, it will display "Successfully issued, please continue", click 'Exit' to return to the device ID search interface.

Click "next" for bulk quantity meters settings. It will enter the last setting page and retain the data set last time. Users only need to change the meter number and submit.

Note: The device status will be of fine after submitted successfully.

6 Common Failure Analysis

➤ No display after device is powered on

- Check whether the power supply voltage and other wiring are correct, and the power supply voltage should be within the working range.
- Turn of f the device and host computer, and then restart.
- The device does not work properly after power-on.
- Turn of f he device and host computer, and then restart.

➤ Incorrect voltage or current reading

- Check whether the wiring mode setting matches the actual wiring method.
- Check whether the PT and CT ratio are set correctly.
- Check if GND is grounded properly.
- Check if the shield is grounded.
- Check if the PT and CT are in good condition.

➤ Power or power factor is incorrect while the voltage and current is correct.

- Compare the voltage and current input of the actual wiring and the wiring diagram, and check whether the phase wiring is correct.

➤ RS485 communication is abnormal

- Check whether the communication baud rate, ID and communication protocol settings of the host computer are consistent with the device.
- Check whether the settings of data bits, stop bits and parity bits are consistent with those of the host computer.
- Check if the RS-232/RS-485 converter is normal.
- Check whether there is any problem with the entire communication network line (short circuit, open circuit, grounding, whether the shielded wire is properly grounded, etc.)
- Turn of f the device and the host computer, and then turn it on again.
- It is recommended to connect a 100-200Ω in parallel at the end of the communication line.

➤ Wireless communication is abnormal

- **Lora wireless communication**
 - Check whether the antenna placement, channel, speed and relative equipment are consistent.
- **WIFI wireless communication**
 - Check whether the WIFI hotspot account and password are correct.
 - Check if the WIFI can be connected to the Internet normally
- **4G wireless communication**
 - Check 4G antenna placement, server is normal, if SIM card is in arrears, etc.

7. Contact information

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