Multifunction Power Meter User Manual

Overview

Multifunctional power meter is a kind of programmable

measurement, display, digital communication

It is a multi-functional power meter with functions such as information

and power pulse transmission output, which can complete the power

Measurement, energy metering, data display, acquisition and

transmission, which can be widely used in substations

Automation, power distribution automation, intelligent building, power

measurement, management within enterprises,

assessment. The measurement accuracy is 0.5 grade, and the LED field

display and remote RS-485 data are realized.

Word communication interface, using MODBUS-RTU communication

protocol.

Shape code	name	Measurement	show	Accessibility
72 square	Multifunctional power meter	Three-phase voltage, three-phase current, total active power, total reactive power, total power factor, rate active energy, reactive energy	LED paging display	digital communication Power pulse output
96 square			LCD paging display	digital communication

1. Technical parameters

<table>
<tr><td colspan="3"></td><td>Parameter</td></tr>
<tr><td rowspan="8">signal input</td><td colspan="2">Wiring</td><td>Three-phase four-wire Y34/three-phase three-wire V33</td></tr>
<tr><td rowspan="3">Voltage</td><td>range</td><td>400V/100V</td></tr>
<tr><td>overload</td><td>Continuous: 1.2 times Instantaneous: 2 times</td></tr>
<tr><td>Power consumption</td><td><1VA</td></tr>
<tr><td rowspan="3">current</td><td>range</td><td>5A/1A</td></tr>
<tr><td>overload</td><td>Continuous: 1.2 times Instantaneous: 2 times</td></tr>
<tr><td>Power consumption</td><td><1VA</td></tr>
<tr><td colspan="2">frequency</td><td>40~65 Hz</td></tr>
<tr><td colspan="3">Power supply</td><td>AC220V (default) or AC/DC80−270V</td></tr>
<tr><td colspan="3">Electrical energy pulse</td><td>Passive optocoupler collector output
Fixed pulse width 80mS±20%</td></tr>
<tr><td colspan="3">Communication</td><td>RS485 communication interface, physical layer isolation
MODBUS-RTU protocol in line with international standards
Communication speed 1200~9600
Validation method N81, E81, O81</td></tr>
<tr><td colspan="3">Analog output</td><td>0/4~20mA or 0~5/10V transmission output
Programmable setting of transmission items and corresponding values</td></tr>
<tr><td colspan="3">Relay output</td><td>Programmable remote control/alarm relay output
Capacity 5A/250VAC 5A/30VAC
Programmable alarm power, switch input, analog input or remote control</td></tr>
<tr><td colspan="3">Telemetry switch</td><td>Telemetry switch input measurement, passive dry junction input
Programmable associated alarm output</td></tr>
<tr><td colspan="3">Measurement class</td><td>Power: 0.5 Frequency: ±0.1Hz
Active energy: 0.5S
Reactive energy: 1
Analog Input: 0.5</td></tr>
<tr><td colspan="3">Display method</td><td>Integrated digital tube/HD LCD display</td></tr>
</table>

Environment	Working temperature: -10-55℃ Storage temperature: -20-75℃
Safety	Insulation: signal, power, output terminal-to-shell resistance > 5MΩ Withstand voltage, signal input, power supply, output > AC2KV

2. Install on the wiring

2.1 Meter size

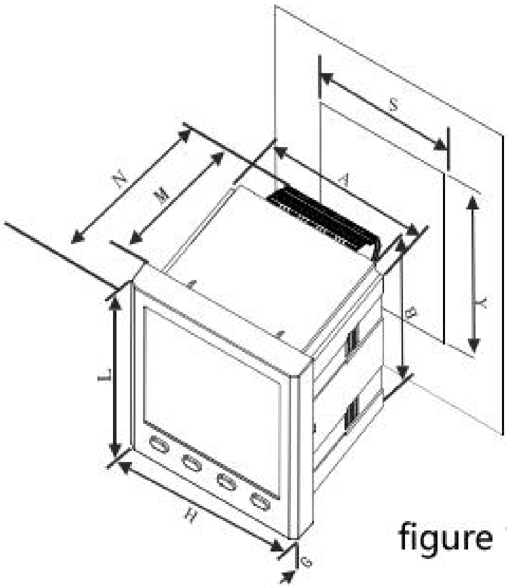


figure 1

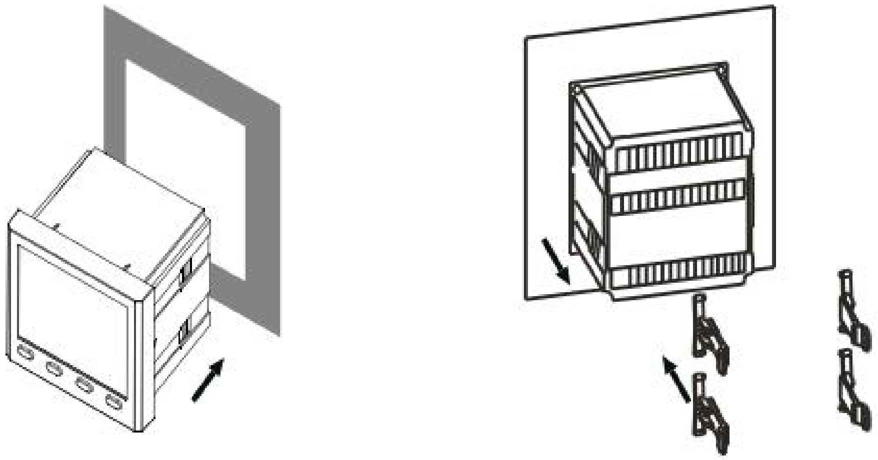
Installation size: A×B

Hole size: S×Y

Panel size: L×H (unit mm)

Dimensions (L×H) Unit(mm)	Screen fit size (A×B) Unit(mm)	Hole Size (S×Y) Unit (mm)	Total length (N) (mm)	Depth (M) (mm)
120×120	110×110	111×111	93	78
96×96	91×91	92×92	93	78
80×80	75×75	76×76	71	68
72×72	67×67	68×68	71	68

2.2 Installation method



Front view Rear view Figure 2

2.3 Function description of wiring terminal

1) Signal and function terminal numbers

This series of terminals adopts a unified number, which is suitable for all products of this series, and its conditions are shown in the following table:

Power supply	1,2	AC 220V,AC/DC80-270V
Current signal	4,5,6,7,8,9	4.6.8 is the three-phase current incoming line terminal
Voltage signal	11,12,13,14	Three-phase voltage input UA, UB, UC, UN respectively
Relay output	15~22	4 relay outputs
Transmit output	30,31,32,33,34	4-channel 4-20mA transmission output, 30 is the common terminal
Electrical energy pulse	47,48,49	47 and 49 are the positive terminal of passive output, which is connected to the positive terminal of the external power supply.
RS485	58,59	respectively A+, B-
switch input	70~74	4-way switch input, 70 is the common terminal

2) Instructions for use:

(a) 1 and 2 are auxiliary power supply for instrument operation, the limit power supply voltage is AC220V (default), please ensure that the power supply is suitable for this series of products to prevent damage to the product.

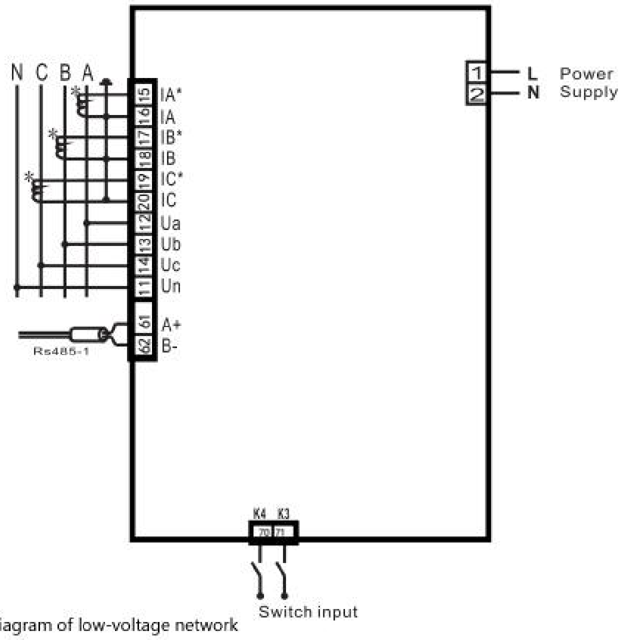
(b) 4, 6, and 8 are the incoming terminals of the current transformer, and the ones marked with * are the incoming terminals of the current

(c) Three-phase three-wire connection method: In the three-phase three-wire network, the B-phase current does not need to be connected, and UB is connected to the No. 14 terminal. The specific wiring can refer to 2 and 4 wiring.

(d) For the use of detailed wiring terminals, please connect according to the wiring diagram on the specific product shell

2.4 Wiring

(1) Typical wiring diagram of low-voltage network

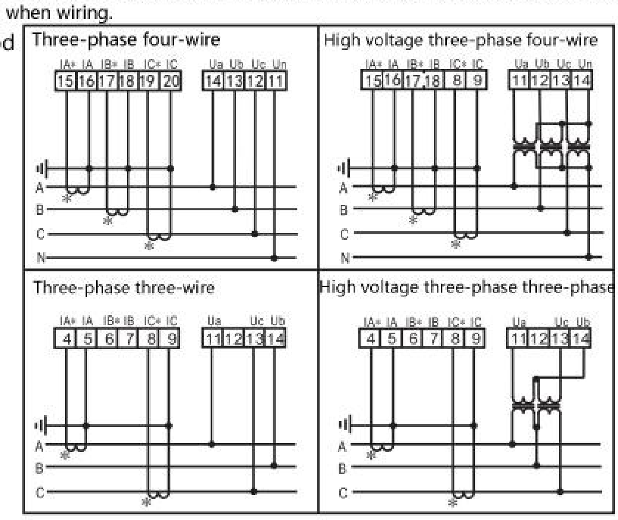


Typical wiring diagram of low-voltage network

This figure takes the enhanced model with an external dimension of 120*120 as an example.The wiring diagrams of other products are similar, but the number of terminals and functional modules is reduced.

Note: The order of the wiring terminals of each product is slightly different.Please connect according to the wiring diagram on the product shell when wiring.

(2) Input signal wiring method



Wiring

1) Auxiliary power supply:

The multi-function power meter has a universal (AC/DC) power input interface. If no special statement is made, the provided

It is a standard product of AC/DC85～270V power interface, which ensures that the provided power supply is suitable for this series of products.

product to prevent damage to the product. ("1" is positive when Dc is powered, "2" is negative)

Note: When using AC power supply, it is recommended to install a 1A fuse on the live wire side

When the power quality is poor, it is recommended to install a surge suppressor in the power circuit to prevent lightning strikes and fast bursts

suppressor.

2) Input signal:

The multi-function power meter adopts the calculation method of separate collection of each measurement channel to ensure complete Consistently symmetrical, it has a variety of wiring methods. Applicable to different load forms.

Note: For specific wiring and instrument parameters (pulse constant, etc.), see the wiring diagram attached to the instrument.

A. Voltage input: The input voltage should not be higher than the rated input voltage (100V or 400V) of the product.

Note, the factory is AC0~500V, if it is higher than 500V, PT should be considered, and 1A insurance must be installed at the voltage input end Silk.

B. Current input: The standard rated input current is 5A, if it is greater than 5A, an external CT should be used. if use

There are other instruments connected to the CT used, and the wiring should be connected in series. Before removing the current input connection of the product,

Be sure to disconnect the CT primary circuit or short the secondary circuit first. It is recommended to use the terminal block, do not directly connect to the CT,

for disassembly.

C. It is necessary to ensure that the input voltage and current are corresponding, in the same order and in the same direction; otherwise, there will be power and

The value and sign of the energy are wrong.

D. The instrument can work in the three-wire four-wire mode or the three-phase three-wire mode, the user should be based on the use of the site

Select the corresponding wiring method. Generally, the three-phase three-wire wiring method is used when there is no center line.

In the case of three-phase four-wire wiring, only two CTs (A-phase and B-phase) can be installed for three-phase three-wire, three-phase four-wire

The line needs to install three CTs (in the case of only 2CTs, another phase current can be combined).

Note: (1). Two wiring methods can be set in the meter, the actual wiring method and the setting method in the meter must be consistent, otherwise the meter

The measurement data of the table is inaccurate.

(2). The specific wiring method, pulse constant and other technical parameters are subject to the random wiring diagram of the product.

3. Programming operation

3.1 Entering and exiting programming state

Press the "SET" key in the display state to enter the password authentication page, use the "←" key or "→" key to enter the password (the default user input password is 0001), and then press the "↵ " key to enter the programming state page. Note: If After entering the password and pressing the "↵ " key, the page does not operate, which means that the entered password is incorrect.

When you have returned to the first level menu of the programming interface, press the "SET" key and the meter will prompt "SAVE-YES". At this time, there are two options for operation:

(a) Save and exit. Select "↵ " to save and exit;

(b) Keep the programming state. Selecting the "SET" key means that it does not save and exits the programming state directly. At this time, all previous changes are invalid.

3.2 Use of keys in programming operation

Common functions of four buttons:

"←" key and "→" key are used to switch the menu at the same level or to add or subtract values: "SET" key is used for menu

Single up and back or enter the programming interface, "↵ " is used to enter the lower menu or confirm after modifying the value.

How to realize the increase or decrease of 10,000,000 digits under the digital display interface:

The increase or decrease of the single digit: "→" (press "→" to add data 0-9 cycle)

Increase or decrease of tens digits: When increasing (decrease) the tens digits, you can press "←" to perform shift operation,

Then press "→" again to increase or decrease.

Increase or decrease of hundreds digit: When increasing (decreasing) the number of hundreds digit, you can press "←" to perform shift operation,

Then press again to increase or decrease.

Increase or decrease of thousands digits: When increasing (decreasing) the number of thousands digits, you can press "←" to perform shift operation,

Then press "→" again to increase or decrease.

For example, under the menu item INPT-PT-0001, if you press "→", it will become INPT-PT-0002. If you press the "→" key, you can add and subtract ten digits. At this time, if you press "→" again, it will become INPT-PT-0012.

If you press “→” again, you can add and subtract the hundreds digit,

If you press "→" again, it will change to INPT-PT-0112 If you press "←" again, you can add or subtract thousands.

If you press the "→" key again, it will change to INPT-PT-1112.

3.3 Programming operation

3.3.1 Menu Structure

In the programming state, the display interface adopts the menu method of hierarchical structure, and the instrument provides three rows of LED display: the first row is the first layer of menu information;

The second row of LEDs displays the second level menu information

Row 3 LEDs provide third level menu information

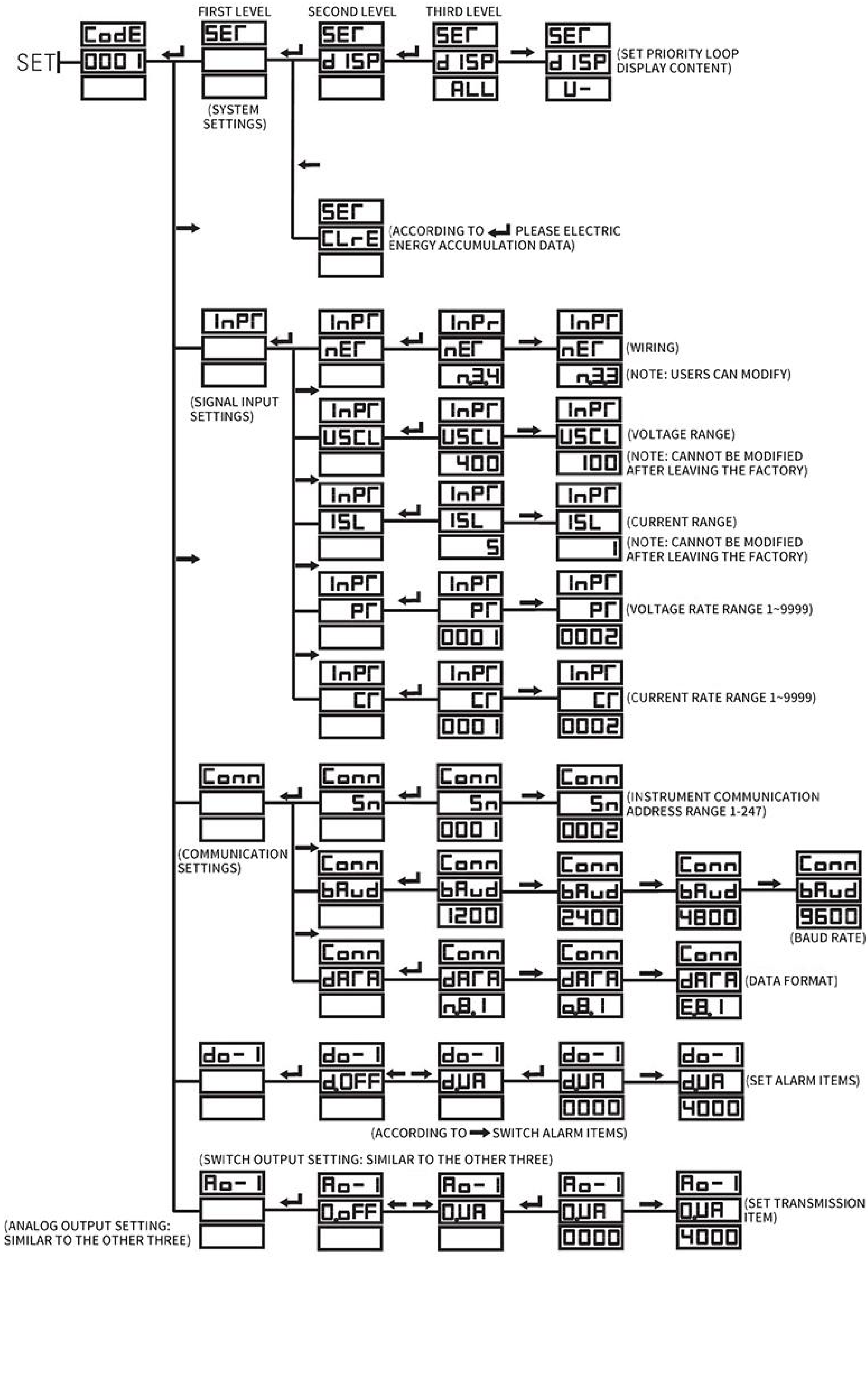
The organization structure of the display interface menu is as follows, the user can select the appropriate setting parameters according to the actual situation.

Tier 1	Tier 2	Tier 3	Describe
system settings SET	CODE	0~9999	Set user password
	DISP	ALL or other data	Set the priority cycle display item (if it is set to U-, the voltage will be displayed preferentially when the power is turned on; if it is set to ALL, the cycle display will be turned on, and there is no need to manually press the left and right keys to view it)
	Clearing electricity and clearing demand CLr.	"↵" or "SET"	Press "↵" to clear the accumulated energy data Press SET to return to zero
signal input INPT	Wiring method NET	N.3.4 or N.3.3	Select the wiring mode of the input signal (N.3.4 is three-phase four-wire, N.3.3 is three-phase three-wire)
	voltage range U.SCL	400V or 100V	Select the range of the input voltage (cannot be modified after leaving the factory)
	Current range I.SCL	5A or 1A	Select the range of the input current (cannot be modified after leaving the factory)
	Voltage ratio Γ.U	1~5000	Set the voltage ratio = 1 scale / 2 scale
	Current transformation ratio Γ.I	1~5000	Set the current transformation ratio = 1 scale / 2 scale
Communication settings	address SN	1~254	Instrument address range 1~247
	communication speed BAUD	1200~9600	baud rate 1200,2400,4800,9600
	Data Format DATA	N,E,O data Format	Data Format N81,E81,O81
Relay output setting DO-i (i is 1~4)	Select the alarm item or close the alarm (See 5.4 Relay output for details)	Set the specific threshold value of the alarm item	Select the alarm item and set the corresponding threshold value. Once the alarm condition is met, the switch output will be turned on. For example, if it is set to "do-1", "U.UA" and "3800", it means that when the phase A voltage is greater than 380V, the first channel The relay output is turned on
Transmitter output setting AO-i (i is 1~4)	Select the transmission item or close the transmission output (see 5.3 Transmission output for details)	Set the full scale value of the transmission item	Select the transmission item and the corresponding power parameter (ie 0~20mA, 4~20mA, 4~12~20mA) Columns such as set to "Ao-1" "IA H" "5000" means that when the A-phase current 0~5A corresponds to the first channel 4~20mA transmission output signal

Note: The above menu items are the menu items with all functions. If some menu items in the user's use process are less than those in the above table or do not work, it means that the product selected by the user does not support this function.

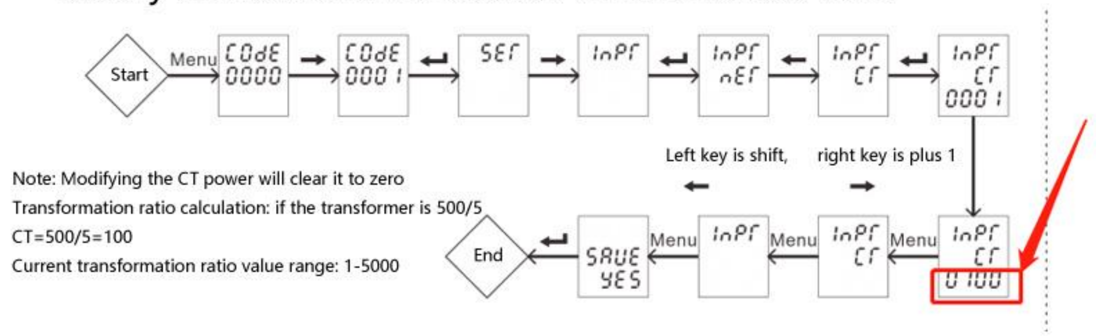
Its structure diagram is as follows

FUNCTION FLOW CHART



Using current transformers, modifying the current ratio operation

Modify the flow chart of current transformation ratio



Instructions:

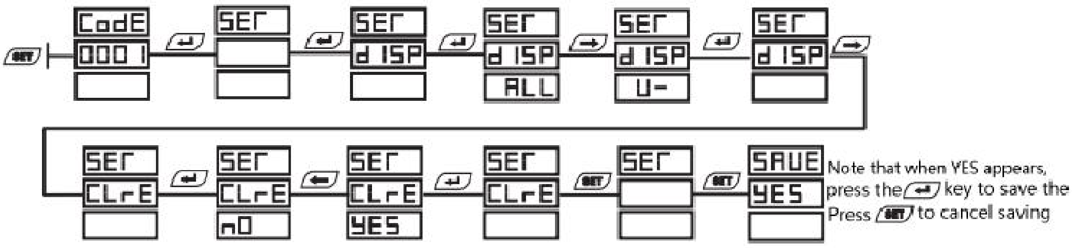
(a) After the data (or option) of the third-level menu is changed, it will take effect only by pressing the "↵" key to return to the second-level menu. does not work).

(b) The factory setting of voltage and current range cannot be modified, and the wiring method can be modified according to the actual wiring method on site.

(c) Under normal circumstances, the type parameters and factory setting parameters of the instrument are marked on the label behind the instrument, and the user can also reprogram the instrument according to actual needs, see 3.3.2 Typical programming operation example for details.

3.3.2 Typical programming operation example

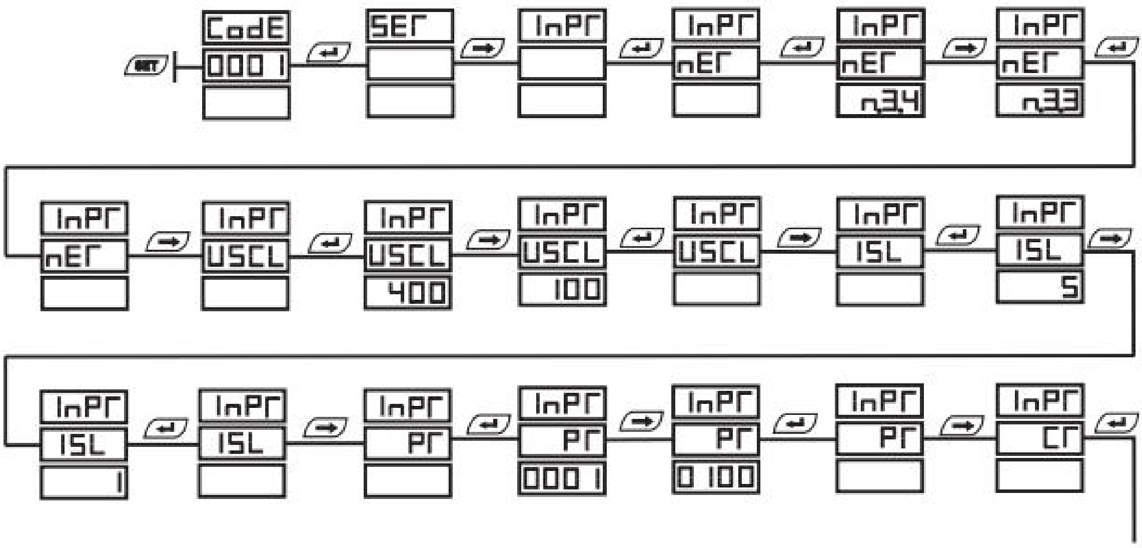
(1) System settings: the user should set the cycle display mode to voltage priority and clear energy data

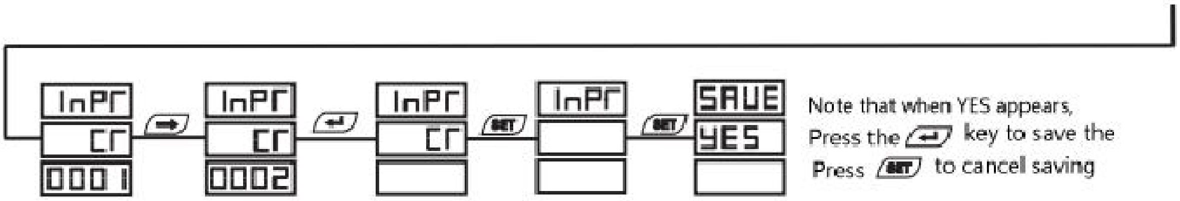


If you only do the electric energy clearing operation, you can skip the operation of modifying the display mode of the measurement information

(3)Setting of input signal (including changing the wiring method):

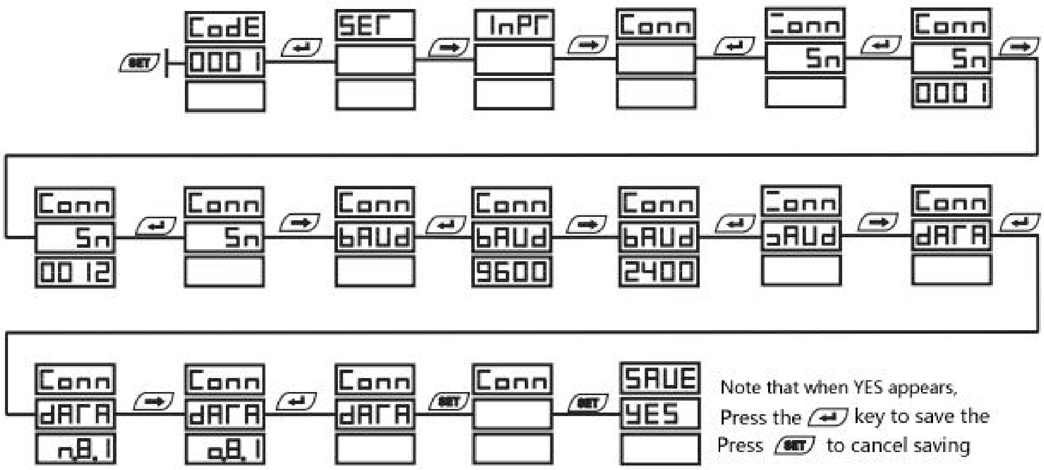
Generally, the user must program the instrument before changing the wiring method or the range of signal input. For example, the user should modify it to three-phase three-wire; 1A meter (assuming the original wiring method is three-phase four-wire; signal: 400V/400V 1A/5A meter) do the following operations: change the wiring method from three-phase four-wire to three-phase three-wire; change the signal input range to: The voltage is 100V, the current is 1A; the voltage ratio is set to 100, and the current ratio is set to 200.





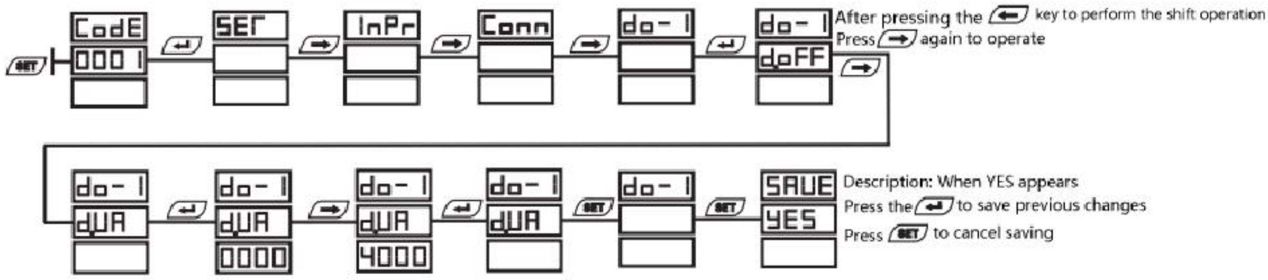
Note: The factory settings of the input voltage and current range are not allowed to be modified, and the wiring method can be modified according to the actual wiring method on site

(4)Example of communication setting: if the user wants to use the communication function of the instrument, he generally needs to check the communication parameters of the instrument or make corresponding modifications. In this example, the user needs to modify the communication address of the instrument to 12, the baud rate to 2400, and the data The format is 0.8.1 odd-effect mode. (Assume that the parameters of the meter before programming are: address 1, baud rate 9600, and data format n.8.1 without verification)

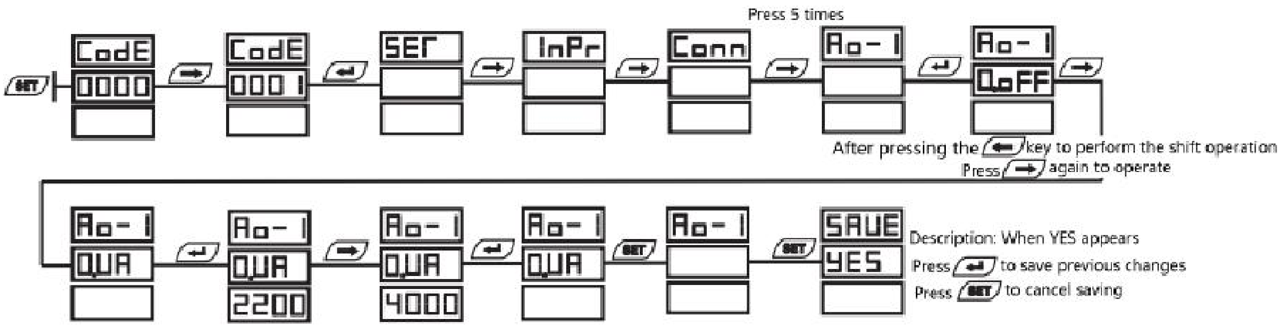


(4) Example of relay alarm output setting: set the A-phase voltage high alarm output. When the A-phase voltage is greater than 400V, the first switch alarm output is realized, that is, the first switch is turned on.

(Assume that the meter is turned off before programming. alarm output status)



(5) Example of analog transmission output setting: set the A-phase voltage 0~400V to correspond to the current signal of 4~20mA transmission output. (Assuming that the instrument is in the off-transmission state, the A-phase voltage signal input range is 400V)

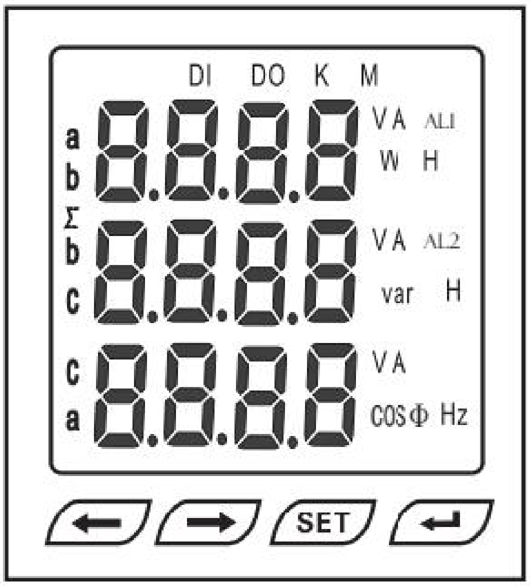


Note: The full scale value of the transmission item must be set accurately, otherwise the transmission will be inaccurate

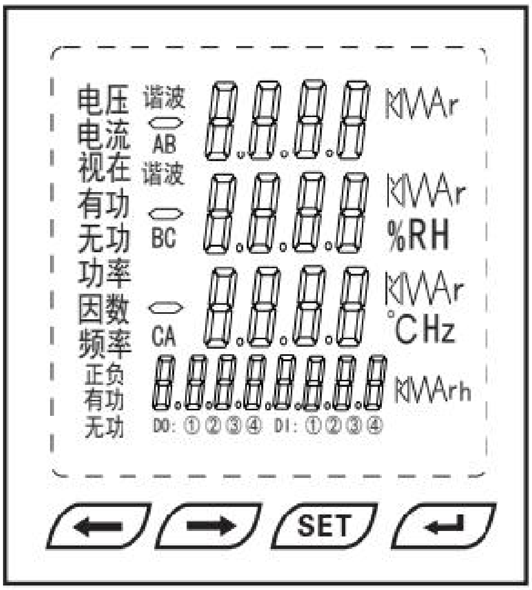
4. Panel description and measurement information display

4.1 Product panel and display information

LED display

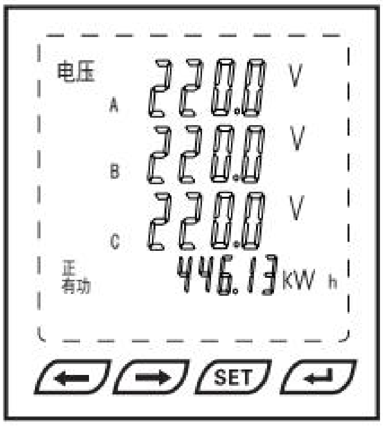
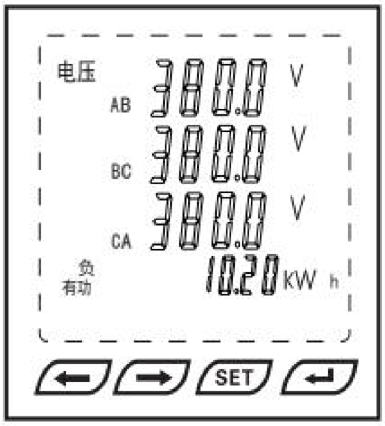
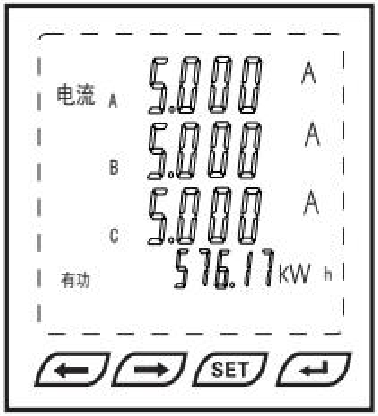


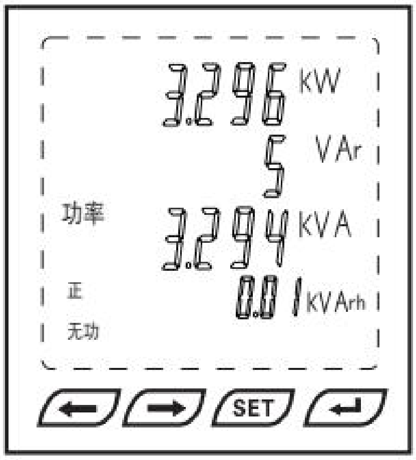
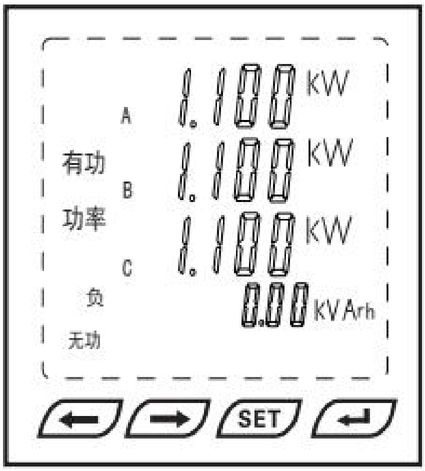
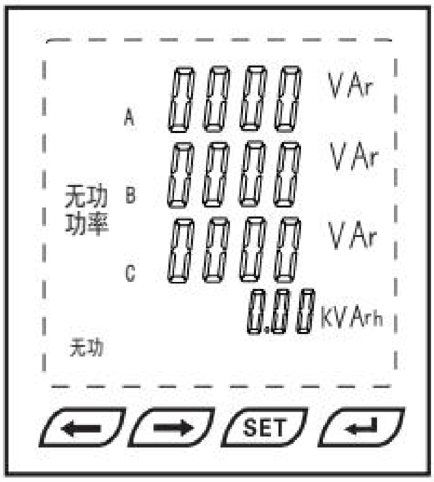
LCD display

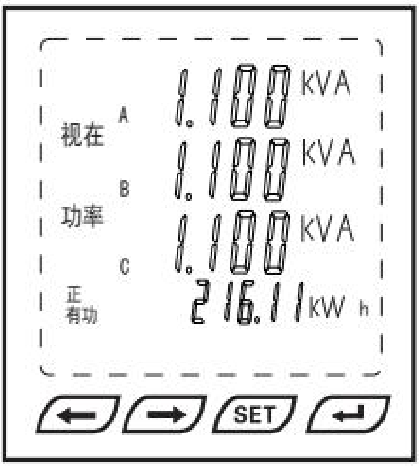
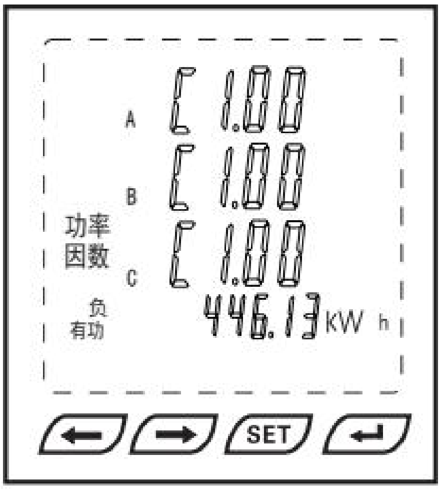
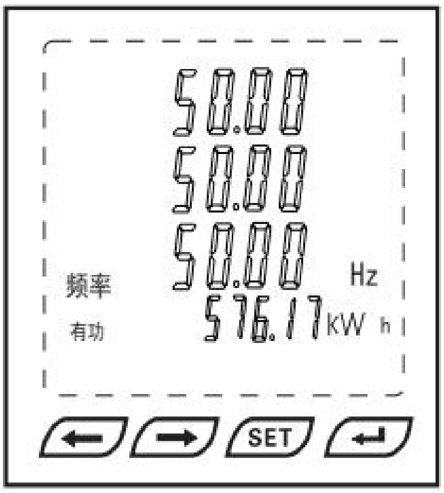


4.2 LCD liquid crystal multi-function display interface information

There are 6 pages of measurement information (the default disp is set to OFF to close the cycle display, when set to other, the setting items will be displayed first when the power is turned on), you can use "←", "→" to switch pages, and "↲ " to display information on the same page , the information switching of each page is shown in the following table

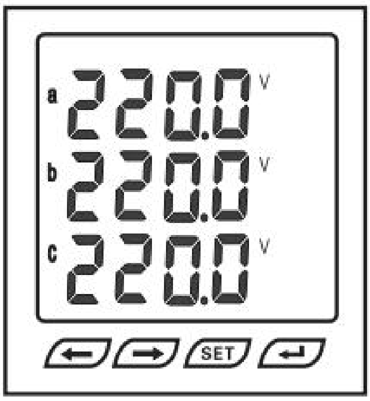
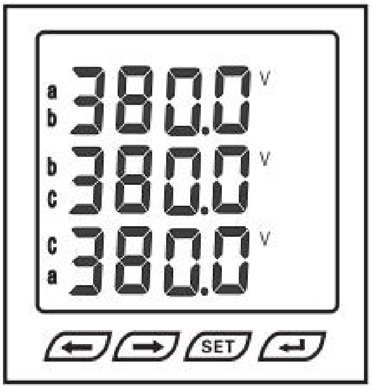
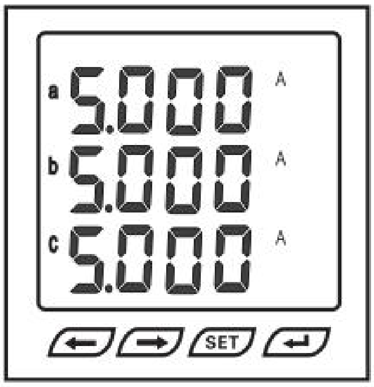
Page	Content	Illustrate
XS1=1		Display the three-phase voltages Ua, Ub, Uc respectively, press the "→" key to display the line voltages Uab, Ubc, Uca. The content displayed in the left picture is the voltage measured once, that is, the input voltage value multiplied by the set PT ratio value.
XS1=2		The three-phase line voltages Uab, Ubc, Uca are displayed respectively. The content displayed in the left picture is the first measurement voltage, that is, the input voltage value multiplied by the set PT ratio value.
XS1=3		Display three-phase currents Ia, Ib, Ic respectively In the left picture, Ia=5.000A, Ib=5.000A Ic=5.000A The displayed current is a primary value, that is, the input current value is multiplied by the set CT transformation ratio.

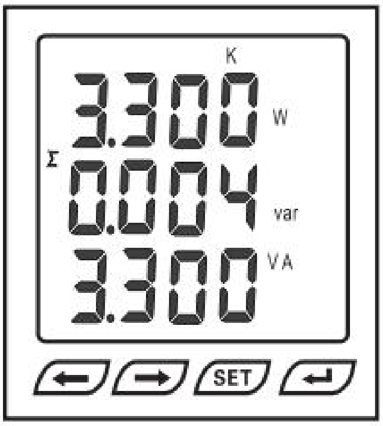
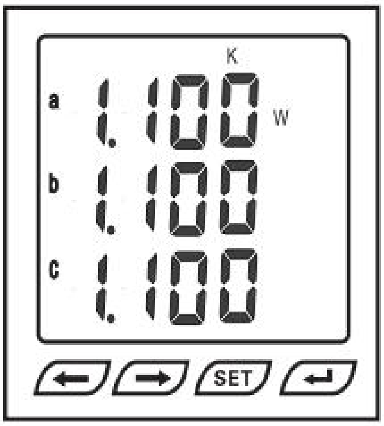
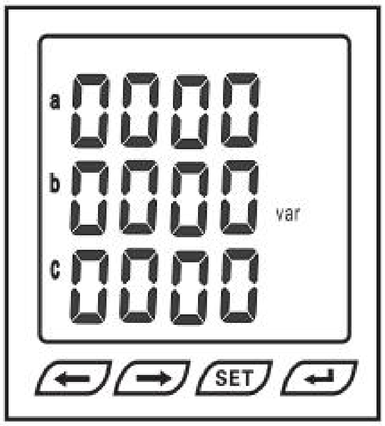
Page	Content	Illustrate
XS1=4		The image on the left shows Active power Reactive power Inspecting power
XS1=5		The figure on the left shows the three-phase Active power A-phase active power is 1.100KW B-phase active power is 1.100KW C-phase active power is 1.100KW
XS1=6		The figure on the left shows the three-phase Reactive power Phase A reactive power is 0000VAr B-phase reactive power is 0000VAr C-phase reactive power is 0000VAr

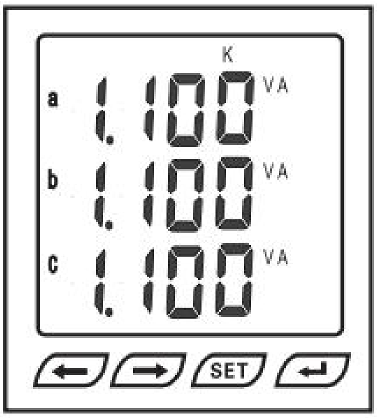
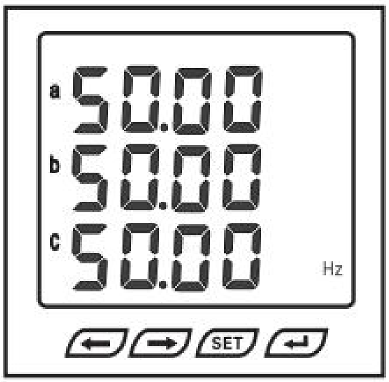
Page	Content	Illustrate
XS1=7		The figure on the left shows the three-phase Inspecting power A-phase apparent power is 1.100KVA B-phase apparent power is 1.100KVA C-phase apparent power is 1.100KVA
XS1=8		The figure on the left shows the Three-phase power factor A phase power factor is 1 Phase B power factor is 1 Phase C power factor is 1
XS1=9		The figure on the left shows the Three-phase frequency A-phase frequency is 50Hz B-phase frequency is 50Hz C-phase frequency is 50HZ

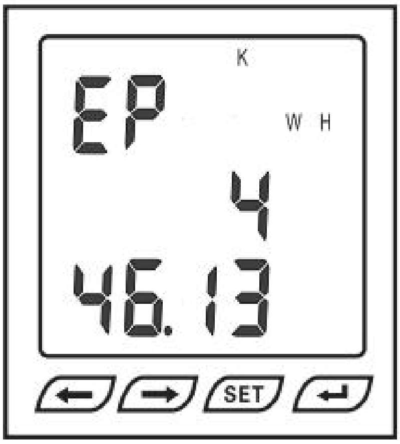
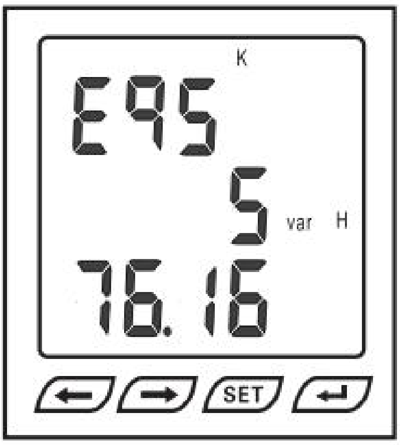
4.3 LED digital multi-function display interface information

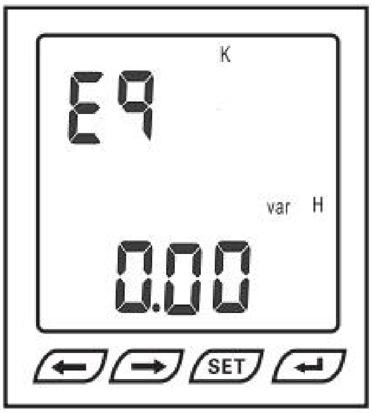
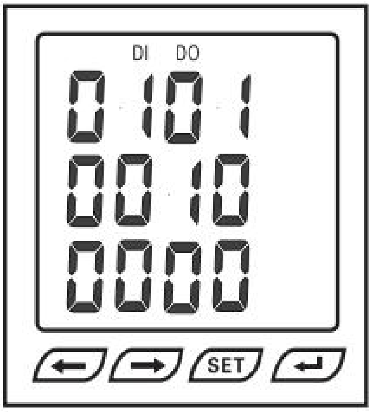
There are 11 pages of measurement information (the default disp is set to OFF to close the cycle display, when it is set to other, the setting items will be displayed preferentially when the power is turned on), you can use "←", "→" to switch pages, and "↲ " to display information on the same page , the information switching of each page is shown in the following table.

Page	Content	Illustrate
XS1=1		Display the three-phase voltages Ua, Ub, Uc respectively. The content displayed in the left picture is the first measurement voltage, that is, the input voltage value multiplied by the set PT ratio value.
XS1=2		The three-phase line voltages Uab, Ubc, Uca are displayed respectively. The content displayed in the left picture is the first measurement voltage, that is, the input voltage value multiplied by the set PT ratio value.
XS1=3		Display the three-phase current IA, IB, IC, IA=5.000A in the left picture IB=5.000A IC=5.000A The displayed current is a primary value, that is, the input current value is multiplied by the set CT ratio.

Page	Content	Illustrate
XS1=4		The images on the left show: active power,reactive power, inspecting power, Active power is 3.300KW Reactive power is 0.004KVar Apparent power is 3.300KVA
XS1=5		The figure on the left shows the three-phase active power: The active power of phase A is 1.100KW The active power of phase B is 1.100KW The active power of phase C is 1.100KW
XS1=6		The figure on the left shows the three-phase reactive power: The reactive power of phase A is 0000Var The reactive power of phase B is 0000Var The reactive power of phase C is 0000Var

<table>
<tr><th>Page</th><th>Content</th><th>Illustrate</th></tr>
<tr><td>XS1=7</td><td>
</td><td>The figure on the left shows the three-phase apparent power:
The apparent power of phase A is 1.100KVA
The apparent power of phase B is 1.100KVA
The apparent power of phase C is 1.100KVA</td></tr>
<tr><td>XS1=8</td><td>
</td><td>The figure on the left shows the three-phase power factor:
The power factor of phase A is 0.99
The power factor of phase B is 0.99
The power factor of phase C is 0.99</td></tr>
<tr><td>XS1=9</td><td>
</td><td>Display the three-phase frequencies respectively,
A-phase frequency in the left picture = 50Hz
B-phase frequency = 50Hz,
C-phase frequency = 50Hz.</td></tr>
</table>

Page	Content	Illustrate
XS1=10		EPS stands for total active energy, Second and third row connections Get up and read, degrees on the left mm216.11KWH
XS1=11		EP stands for positive active energy, Second and third row connections Get up and read, degrees on the left 446.13KWH Press the  key to switch to EP - stands for reverse active energy
XS1=12		EqS stands for total reactive energy, Second and third row connections Get up and read, degrees on the left 576.16KVarH

Page	Content	Illustrate
XS1=13		Eq stands for forward reactive energy, Second and third row connections Get up and read, degrees on the left 0.00KVarH Press the key to switch to Eq - represents reverse active energy
XS1=14		Display alarm status DOs and switches quantity input status DI, shown in the figure on the left Indicates that the 2nd and 4th relays are in outputThe 3rd road is opened in the suction stateis on

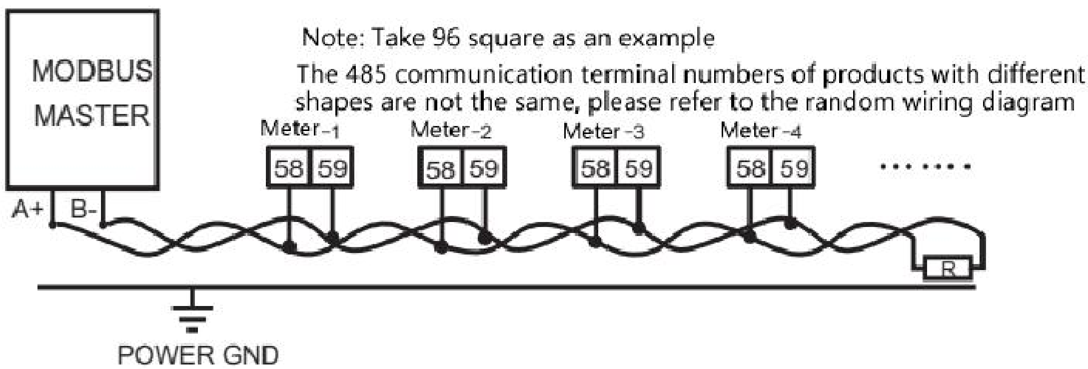
5. Function module

5.1 Communication

The multi-function power meter provides serial asynchronous half-duplex RS485 communication interface, adopts MODBUS-RTU communication protocol, and various data information can be transmitted on the communication line. Up to 64 network power meters can be connected on one line at the same time. Each network power meter can set its communication address (Address NO.) and baud rate. The communication connection should use shielded twisted pair with copper mesh. Wire, the wire diameter is not less than 0.5mm. When wiring, the communication line should be used to keep away from the strong electric cable or other strong electric field environment. Do not A star or other connection is recommended.

MODBUS/RTU communication protocol: MODBUS protocol adopts the communication connection mode of master-slave response mode on one communication line. First, the signal of the host computer is addressed to a terminal device (slave) with a unique address, and then the response signal sent by the terminal device is transmitted to the host in the opposite direction, that is, on a separate communication line, the signal goes along the opposite direction. All communication data streams are transmitted in both directions (half-duplex mode of operation)

The MODBUS protocol only allows communication between the host (PC, PLC, inverter, etc.) and the terminal equipment, but does not allow data exchange between independent terminal equipment, so that the terminal equipment will not occupy the communication line when they are initialized, and Only in response to the inquiry signal that arrives at the machine.



The MODBUS protocol only allows communication between the host (PC, PLC, inverter, etc.) and the terminal equipment, and does not allow data exchange between independent terminal equipment, so that the terminal equipment will not occupy the communication line when they are initialized, and Only in response to the inquiry signal that arrives at the machine.

Host query: The query message frame includes device address code, function code, data information code, and check code. The address code indicates the function code of the selected slave device to inform the selected slave device what function to perform. For example, function code 03 or 04 requires the slave device to read the registers and return their contents; the data segment contains the slave device to execute. Other additional information of the function, such as in the read command, the additional information of the data segment has the number of registers to be read from which register; the check code is used to verify the correctness of a frame of information, providing a way for the slave device to verify whether the content of the message is correct. The correct way, it uses the calibration rules of CRC16.

Slave response: If the slave device generates a normal response, there are slave address code, function code, data information code and CRC16 check code in the response message. Data message codes include data collected from the device: such as register values or status. If an error occurs, our agreement is that the slave will not respond.

Transmission mode refers to a series of independent data structures in a data frame and limited rules for transmitting data. The transmission mode compatible with the MODBUS protocol-RTU mode is defined below. Bits per byte: 1 start bit, 8 data bits, (parity bit), 1 stop bit (with parity bit) or 2 stop bits (without parity bit) .

The structure of the data frame: the message format.

Address code	Function code	Data code	Check code
1 BYTE	1 BYTE	N BYTE	2 BYTE

Address code: It is the beginning of the frame, consisting of one byte (8-bit binary code), 0~255 in decimal, only 1~247 is used in our system, other addresses are reserved, these bits indicate the terminal specified by the user The address of the device that will receive data from the host connected to it. The address of each terminal device must be unique, and only the addressed terminal will respond to the corresponding query. When the terminal sends back a response, the slave address data in the response tells the host which terminal is communicating with.

Function code: tells what function the addressed terminal performs. The following table lists the function codes supported by this table, as well as their meanings and functions.

Code	Significance
0x01	Read relay output status
0x02	Read switch input status
0x03/0x04	Read data register value
0x05	Remote control of single relay action
0x0F	Remote control of multiple relay actions
0x10	Write Set Register Instruction

Data code: Contains the data required by the terminal to perform a specific function or the data collected when the terminal responds to a query. The contents of these data may be numerical values, reference addresses or setting values. For example, the function code tells the terminal to read a register, the data field needs to indicate which register to start from and how many data to read, and the returned content of the slave data code includes the data length and corresponding data.

Check Code: The Error Check (CRC) field occupies two bytes and contains a 16-bit binary value. The CRC value is calculated by the transmitting device and then appended to the data frame, the receiving device recalculates the CRC value when receiving the data, and then compares it with the value in the received CRC field, if the two values are not equal, it happens mistake.

The process of generating a CRC is:

1) Preset a 16-bit register as FFFFH (hexadecimal, all 1s), which is

called a CRC register.

2) XOR the 8 bits of the first byte in the data frame with the low byte in the CRC register, and store the result back into the CRC register.

3) Shift the CRC register one bit to the right, fill the highest bit with 0, and remove the lowest bit and check it.

4) If the bit shifted out in the previous step is 0: repeat the third step (the next shift): 1; perform XOR operation on the CRC register with a preset fixed value (0A001H).

5) Repeat steps 3 and 4 until 8 shifts. This completes a full eight bits.

6) Repeat steps 2 to 5 to process the next eight bits until all bytes are processed.

7) The final CRC register value is the CRC value.

5.2 Message Format Instructions

1) Read relay output status (function code 0x01)

Host request	frame structure	address code	function code	data code		check code
				start relay address	relay number	
	Occupied bytes	1 byte	1 byte	2 bytes	2 bytes	2 bytes
	data range	1~247	0x01	0x0000 (fixed)	0x0001~0x0003	CRC
	Message example	0x01	0x01	0x00 0x00	0x00 0x02	0xBD 0XCB
Slave response	frame structure	address code	function code	data code		check code
				register byte	register value	
	Occupied bytes	1 byte	1 byte	1 byte	1 byte	2 bytes
	Message example	0x01	0x01	0x01	0x03	0x11 0x89
illustrate	The register value that the slave responds to is the relay state value.The lowest bit of the byte corresponds to the state value of each relay output. 1 means the closed state, and 0 means the open state. For example, the binary value of the register value "0x03" in the above example is "0000". 0011", indicating that the 1st and 2nd relays are closed					

2) Read switch input status (function code 0x02)

<table>
<tr><td rowspan="4">host requestc</td><td>frame structure</td><td>address code</td><td>function code</td><td colspan="2">data code
start switch address | switch number</td><td>check code</td></tr>
<tr><td>Occupied bytes</td><td>1 byte</td><td>1 byte</td><td>2 bytes</td><td>2 bytes</td><td>2 bytes</td></tr>
<tr><td>data range</td><td>1~247</td><td>0x01</td><td>0x0000 (fixed)</td><td>0x0001~ 0x0004</td><td>CRC</td></tr>
<tr><td>Message example</td><td>0x01</td><td>0x02</td><td>0x00 0x00</td><td>0x00 0x04</td><td>0x79 0XC9</td></tr>
<tr><td rowspan="3">Slave response</td><td>frame structure</td><td>address code</td><td>function code</td><td colspan="2">data code
register byte | register value</td><td>check code</td></tr>
<tr><td>Occupied bytes</td><td>1 byte</td><td>1 byte</td><td>1 byte</td><td>1 byte</td><td>2 bytes</td></tr>
<tr><td>Message example</td><td>0x01</td><td>0x02</td><td>0x01</td><td>0x02</td><td>0x20 0x49</td></tr>
<tr><td>illustrate</td><td colspan="6">The register value that the slave responds to is the switch input state value, starting from the lowest bit of the byte corresponding to the state value of each switch input, 1 means the closed state, 0 means the open state, such as the binary value of the register value "0x02" in the above example "0000 0010" means that the second switch input is closed.</td></tr>
</table>

(3) Read data register value (function code 0x03/0x04)

<table>
<tr><td rowspan="4">host request</td><td>frame structure</td><td>address code</td><td>function code</td><td colspan="2">data code
start register address | register number</td><td>check code</td></tr>
<tr><td>Occupied bytes</td><td>1 byte</td><td>1 byte</td><td>2 bytes</td><td></td><td>2 bytes</td></tr>
<tr><td>data range</td><td>1~247</td><td>0x03/0x04</td><td></td><td>max 25</td><td>CRC</td></tr>
<tr><td>Message example</td><td>0x01</td><td>0x03</td><td>0x00 0x3D</td><td>0x00 0x03</td><td>0x79 0XC9</td></tr>
<tr><td rowspan="3">Slave response</td><td>frame structure</td><td>address code</td><td>function code</td><td colspan="2">data code
register byte | register value</td><td>check code</td></tr>
<tr><td>Occupied bytes</td><td>1 byte</td><td>1 byte</td><td>1 byte</td><td>N bytes</td><td>2 bytes</td></tr>
<tr><td>Message example</td><td>0x01</td><td>0x03</td><td>0x06</td><td>6 bytes of data</td><td>(CRC)</td></tr>
<tr><td>illustrate</td><td colspan="6">The starting register address requested by the host is the first address of the primary grid or secondary grid data to be queried, and the number of registers is the length of the query data.For example,the starting register address "0x00 0x3D" represents the first address of the three-phase voltage integer data, the number of registers "0x00 0x03" represents the data length of 3 word data. Please refer to the MODBUS-RTU communication address information table in the appendix.</td></tr>
</table>

(4) Remote control single relay output (function code 0x05)

	frame structure	address code	function code	data code		check code
				start relay address	relay Action value	
host request	Occupied bytes	1 byte	1 byte	2 bytes	2 bytes	2 bytes
	data range	1~247	0x05	0x0000 ~ 0x0003	0xFF00~ 0x0000	CRC
	Message example	0x01	0x05	0x00 0x00	0xFF 0x02	0x0D 0XFB
Slave response	frame structure	address code	function code	data code		check code
				start relay address	relay Action value	
	Occupied bytes	1 byte	1 byte	2 bytes	2 bytes	2 bytes
	Message example	0x01	0x05	0x00 0x00	0xFF 0x00	0x0D 0xFB
illustrate	The relay action value "0xFF00" requested by the host means closed, and "0x0000" means open. To use the remote command, the relay must be set to work in remote mode.					

(5) Remote control multiple relay output (function code 0x0F)

	frame structure	address code	function code	data code				check code
				start relay address	relay number	data bytes	relay Action value	
host request	Occupied bytes	1 byte	1 byte	2 bytes	2 bytes	1 byte	1 byte	2 bytes
	data range	1~247	0x0F	0x0000 (fixed)	0x0001~ 0x0004	0x01		CRC
	Message example	0x01	0x0F	0x00 0x00	0x00 0x03	0x01	0x07	0xCE 0X95
Slave response	frame structure	address code	function code	data code				check code
				Start relay address		Number of relays		
	Occupied bytes	1 byte	1 byte	2 bytes		1 byte		2 bytes
	Message example	0x01	0x0F	0x00 0x00		0x00 0x03		0x15 0xCA
illustrate	The relay action value requested by the host corresponds to each relay output from the lowest bit of the byte, 1 means closing the relay, 0 means opening the relay, as in the example above, the binary "0000 0111" of the relay action value "0x07" means the first channel of the remote control , No. 2 and No. 3 relays are closed.							

(6) Write setting register instruction (function code 0x10)

<table>
<tr><td rowspan="5">host request</td><td rowspan="2">frame structure</td><td rowspan="2">address code</td><td rowspan="2">function code</td><td colspan="4">data code</td><td rowspan="2">check code</td></tr>
<tr><td>start register address</td><td>register number</td><td>data bytes</td><td>data input</td></tr>
<tr><td>Occupied bytes</td><td>1 byte</td><td>1 byte</td><td>2 bytes</td><td>2 bytes</td><td>1 byte</td><td>N bytes</td><td>2 bytes</td></tr>
<tr><td>data range</td><td>1~247</td><td>0x10</td><td></td><td>max 25</td><td>Max 2*25</td><td></td><td>CRC</td></tr>
<tr><td>Message example</td><td>0x01</td><td>0x10</td><td>0x00 0x59</td><td>0x00 0x02</td><td>0x04</td><td>0x00 0x64 0x00 0x0A</td><td>0xF7 0X21</td></tr>
<tr><td rowspan="4">Slave response</td><td rowspan="2">frame structure</td><td rowspan="2">function code</td><td rowspan="2">function code</td><td colspan="4">data code</td><td rowspan="2">check code</td></tr>
<tr><td colspan="2">start register address</td><td colspan="2">register value</td></tr>
<tr><td>Occupied bytes</td><td>1 byte</td><td>1 byte</td><td colspan="2">2 bytes</td><td colspan="2">2 bytes</td><td>2 bytes</td></tr>
<tr><td>Message example</td><td>0x01</td><td>0x10</td><td colspan="2">0x00 0x59</td><td colspan="2">0x00 0x02</td><td>0x91 0xDB</td></tr>
<tr><td>illustrate</td><td colspan="8">To ensure normal communication, each time a host request is executed, the number of registers is limited to 25. In the above example, the starting register address "0x00 0x59" represents the first address of the voltage transformation ratio setting. The number of registers "0x00 0x02" indicates that the voltage transformation ratio and the current transformation ratio are set with a total of 2 Word data, and the write data "0x00 0x64 0x00 0x0A" Indicates that the voltage transformation ratio is set to 100 and the current transformation ratio to 10. Please refer to the MODBUS-RTU communication address information table in the appendix</td></tr>
</table>

5.3 Transmitter output

The series liquid crystal multi-function power meter has the function of analog transmission, and each channel can flexibly set the transmission item and the transmission range, such as 4. 5A corresponds to the output 0 ~ 20mA), 4 , PH 5700 (PA0 ~ 5700W corresponds to the output 4 ~ 20mA , 4 . P 5700 (PS a 5700W ~0 ~ + 5700W corresponds to the output 4 ~ 12 ~ 20mA), etc. , the detailed transmission items can refer to the transmission output comparison table.
Electrical parameters: output 0/4 ~20mA . 0/l ~5V . 0/2 ~10V .
Accuracy class: 0.5S
Overload: 120% effective output, maximum current 24mA, voltage 12V.
Load: Rmax = 400 Ω
Transmission items: phase voltage. line voltage. Phase current, phase active power, total active power. Phase reactive power, total reactive power. Three-phase power, total apparent power. Power factor, frequency. Bidirectional active power and bidirectional reactive power, etc.
Customers can also specify the transmission items and transmission range in detail when ordering. The instrument will be set according to the user's requirements when it leaves the factory; the user can also leave the product according to the actual needs. Modify the transmission item and transmission output range, but cannot modify the electrical parameters 0/4~20mA , 0/1~5V , 0 / 2~10V .

5.4 Relay output and binary input

Relay capacity: 5A 250VAC/5A 30VDC
Customers who need special specifications of relay capacity can contact the marketing department of our company for special customization.
The relay output module has two working modes to choose from: electric alarm mode and communication remote control mode. Each relay can flexibly set the working mode, reporting items and reporting scope during programming operation. For example, the alarm range "4000"

of the report item "U.UA" indicates that the relay switch is turned on when UA > 400.0V: the alarm range "1000" of the alarm item "d.UA" indicates that the relay switch is turned on when UA < 100.0V .

For detailed settings, please refer to the report item setting table

Relay alarm and binary input detection are displayed on the digital tube in binary form. 1 means ON or alarm, 0 means disconnection or no alarm. When using the communication protocol to check the state of the BIN, first set the BIN to the register. The value is read out, it is decimal at this time, first determine whether the value is a negative number. If so, when converting to binary system, it should be inverted and added 1. If not, it should be converted directly. The data of input and output is 16 digits. The bit is the 8th channel open input, and the last bit is the first channel alarm output.

6. Common problems and solutions

6.1 About Communication

1) The instrument does not send back data Answer: First, make sure that the communication setting information of the instrument, such as slave address, baud rate, verification method, etc., is consistent with the requirements of the host computer; Whether the connection is accurate and reliable, and whether the RS485 converter is normal. If only a single block or a few instruments have abnormal communication, also check the corresponding communication line. You can modify the address of the abnormal and normal instrument slaves to test, eliminate or confirm the software problem of the upper computer, or test by exchanging the installation position of the abnormal and normal instrument to eliminate or confirm the instrument failure.

2) The data returned by the meter is inaccurate; the communication data of the LCD multi-function power meter open to the customer includes the primary grid float type data and the secondary grid int/long type data. Please read carefully the description of the data storage address and storage format in the correspondence address table, and make sure to convert it according to the corresponding data format. The data can be displayed in integer, floating point, hexadecimal and other formats, and can be directly compared with the instrument display data.

6.2 Inaccurate measurement of U, 1, P, etc.

Answer: First, you need to make sure that the correct voltage and current signals have been connected to the meter. You can use a multimeter to measure the voltage signal, and use a clamp meter to measure the current signal if necessary. Secondly, make sure that the connection of the signal line is correct, such as the same name end of the current signal (that is, the incoming line end). And whether the phase sequence of each phase is wrong. For the meter, you can observe the power interface display. Only in the case of reverse power transmission, the active power is negative. In general, the active power sign is positive. If the active power sign is negative, it is possible that the current input and output lines are connected incorrectly. Of course, wrong phase sequence connection will also lead to abnormal power display. In addition, it should be noted that the power displayed by the meter is the value of the primary grid. If the multiplier of the voltage and current transformer set in the meter is inconsistent with the multiplier of the actual transformer used, it will also cause the meter to display inaccurate power. The voltage and current ranges in the meter are not allowed to be modified after leaving the factory. The wiring network can be modified according to the actual connection method on site, but the setting of the wiring method in the programming menu should be consistent with the actual wiring method, otherwise it will lead to wrong display information.

6.3 Inaccurate words about electric energy

Answer: The electric energy accumulation of the meter is based on the measurement of power. First observe whether the power value of the meter is consistent with the actual load. The multi-function electric energy meter supports bidirectional electric energy measurement. In the case of wrong wiring and negative total active power, the electric energy will be accumulated to the reverse active energy, and the positive active energy will not be accumulated. The most common problem used in the field is that the incoming and outgoing lines of the current transformer are reversely connected, and the signed active power of the split phase can be seen. If the power is negative, the wiring may be wrong. In addition, the wrong phase sequence will also cause the abnormality of the meter's electric energy.

6.4 The meter does not light up

Answer: Make sure that the appropriate auxiliary power supply (AC/DCSO-270v) has been added to the auxiliary power supply terminal of the instrument. The auxiliary power supply voltage exceeding the specified range may damage the instrument and cannot be recovered. You can use a multimeter to measure the voltage value of the auxiliary power supply. If the power supply voltage is normal and the meter has no display, you can consider powering off the power and re-powering it. If the meter still cannot display normally, please contact the technical service department of our company.

6.5 The meter does not respond to any operation

Answer: Press "←" "→" SET " "↲ " on the instrument keyboard, the instrument does not respond, try to power on again after power off, if the instrument can not return to normal, please contact the technical service department of our company.

6.6 Other Abnormal Conditions

Answer: Please contact the technical service department of our company in time. The user should describe the on-site situation in detail, and the company's technical staff will analyze the possible reasons based on the on-site feedback.

Transmission item setting table

Transmission project	Transmission type setting	Transmission range setting	illustrate
A-phase voltage	0.UA	4000	0-20mA transmission output for A-phase voltage 0-400V
	4.UA	4000	4-20mA transmission output for A-phase voltage 0-400V
B-phase voltage	0.Ub	4000	0-20mA transmission output for B-phase voltage 0-400V
	4.Ub	4000	4-20mA transmission output for B-phase voltage 0-400V
C-phase voltage	0.UC	4000	0-20mA transmission output for C-phase voltage 0-400V
	4.UC	4000	4-20mA transmission output for C-phase voltage 0-400V
AB line voltage	0.UAb	4000	0-20mA transmission output for AB phase voltage 0-400V
	4.UAb	4000	4-20mA transmission output for AB phase voltage 0-400V
BC line voltage	0.UbC	4000	0-20mA transmission output for BC phase voltage 0-400V
	4.UbC	4000	4-20mA transmission output for BC phase voltage 0-400V
CA line voltage	0.UAC	4000	0-20mA transmission output for CA phase voltage 0-400V
	4.UnC	4000	4-20mA transmission output for CA phase voltage 0-400V
A phase current	0. IA	5000	Transmit output of 0-20mA for A-phase current 0-5A
	4. IA	5000	4-20mA transmission output for A-phase current 0-5A
B phase current	0. Ib	5000	0-20mA transmission output for B-phase current 0-5A
	4. Ib	5000	4-20mA transmission output for B-phase current 0-5A
C phase current	0. IC	5000	Transmit output of 0-20mA for C-phase current 0-5A
	4. IC	5000	4-20mA transmission output for C-phase current 0-5A
A-phase active power	0.PA	6000	0-20mA transmission output for A-phase active power 0-6000W
	4.PA	6000	4-20mA transmission output for A-phase active power 0-6000W
B-phase active power	0.Pb	6000	0-20mA transmission output for B-phase active power 0-6000W
	4.Pb	6000	4-20mA transmission output for B-phase active power 0-6000W
C-phase active power	0.PC	6000	0-20mA transmission output for C-phase active power 0-6000W
	4.PC	6000	4-20mA transmission output for C-phase active power 0-6000W
Total active power	0.PS	6000	0-20mA transmission output for total active power 0-6000W
	4.PS	6000	4-20mA transmission output for total active power 0-6000W
Phase A reactive power	0.9A	9000	0-20mA transmission output for A-phase reactive power 0-9000W
	4.9A	9000	4-20mA transmission output for A-phase reactive power 0-9000W
Phase A reactive power	0.9b	9000	0-20mA transmission output for B-phase reactive power 0-9000W
	4.9b	9000	4-20mA transmission output for B-phase reactive power 0-9000W
Phase A reactive power	0.9C	9000	0-20mA transmission output for C-phase reactive power 0-9000W
	4.9C	9000	4-20mA transmission output for C-phase reactive power 0-9000W
Total reactive power	0.95	9000	0-20mA transmission output for total reactive power 0-9000W
	4.95	9000	4-20mA transmission output for total reactive power 0-9000W
A-phase power factor	0.PFA	1000	0-20mA transmission output for A-phase power factor 0-1.000COS
	4.PFA	1000	4-20mA transmission output for A-phase power factor 0-1.000COS
Phase B power factor	0.PFb	1000	0-20mA transmission output for B-phase power factor 0-1.000COS
	4PFh	1000	4-20mA transmission output for B-phase power factor 0-1.000COS

Transmission project	Transmission type setting	Transmission range setting	illustrate
Phase C power factor	0PFC	1000	0-20mA transmission output for C-phase power factor 0-1.000COS
	4PFC	1000	4-20mA transmission output for C-phase power factor 0-1.000COS
Total power factor	0PFS	1000	0-20mA transmission output for total power factor 0-1.000COS
	4PFS	1000	4-20mA transmission output for total power factor 0-1.000COS
A-phase apparent power	0SA	8000	0-20mA transmission output for A-phase apparent power 0-8000W
	4SA	8000	4-20mA transmission output for A-phase apparent power 0-8000W
B-phase apparent power	0Sb	8000	0-20mA transmission output for B-phase apparent power 0-8000W
	4Sb	8000	4-20mA transmission output for B-phase apparent power 0-8000W
C-phase apparent power	0SC	8000	0-20mA transmission output for C-phase apparent power 0-8000W
	4SC	8000	4-20mA transmission output for C-phase apparent power 0-8000W
Total apparent power	0SS	8000	0-20mA transmission output for total apparent power 0-8000W
	4SS	8000	4-20mA transmission output for total apparent power 0-8000W
Frequency	0Fr	0500	0-20mA transmission output for three-phase frequency 0-50Hz
	4Fr	0500	4-20mA transmission output for three-phase frequency 0-50Hz
OFF	0oFF	OFF is to close the transmission output	

Alarm item setting table

Alarm item	Alarm type setting	Alarm range setting	illustrate
A-phase voltage	dUA	4000	Alarm output for A-phase voltage below 400V
	UUA	4000	Alarm output for A-phase voltage higher than 400V
B-phase voltage	dUb	4000	Alarm output for B-phase voltage lower than 400V
	UUb	4000	Alarm output for B-phase voltage higher than 400V
C-phase voltage	dUC	4000	Alarm output for C-phase voltage below 400V
	UUC	4000	Alarm output for C-phase voltage higher than 400V
AB line voltage	dUAb	4000	Alarm output for AB phase voltage lower than 400V
	UUAb	4000	Alarm output for AB phase voltage higher than 400V
BC line voltage	dUbC	4000	Alarm output for BC phase voltage below 400V
	UUbC	4000	Alarm output for BC phase voltage higher than 400V
CA line voltage	dUAC	4000	Alarm output for CA phase voltage lower than 400V
	UUnC	4000	Alarm output for CA phase voltage higher than 400V
A phase current	d. IA	5000	Alarm output for A-phase current below 5A
	U. IA	5000	Alarm output for phase A current higher than 5A
B-phase current	d. Ib	5000	Alarm output for B-phase current below 5A
	U. Ib	5000	Alarm output for B-phase current higher than 5A
C-phase current	d. IC	5000	Alarm output for C-phase current below 5A
	U. IC	5000	Alarm output for C-phase current higher than 5A
A-phase active power	dPA	6000	Alarm output for phase A active power below 6000W
	UPA	6000	Alarm output for phase A active power higher than 6000W
B-phase active power	dPb	6000	Alarm output for B-phase active power below 6000W
	UPb	6000	Alarm output higher than 6000W for B-phase active power
C-phase active power	dPC	6000	Alarm output for C-phase active power below 6000W
	UPC	6000	Alarm output for C-phase active power higher than 6000W
Total active power	dPS	6000	Alarm output for total active power below 6000W
	UPS	6000	

Alarm item	Alarm type setting	Alarm range setting	illustrate
Phase A reactive power	d9A	9000	Alarm output for A-phase reactive power below 9000W
	U9A	9000	Alarm output for A-phase reactive power higher than 9000W
Phase B reactive power	d9b	9000	Alarm output for B-phase reactive power below 9000W
	U9b	9000	Alarm output for B-phase reactive power higher than 9000W
Phase C reactive power	d9C	9000	Alarm output for C-phase reactive power below 9000W
	U9C	9000	Alarm output for C-phase reactive power higher than 9000W
Total reactive power	d9S	9000	Alarm output for total reactive power below 9000W
	U9S	9000	Alarm output for total reactive power higher than 9000W
A-phase power factor	dPFA	1000	Alarm output for A-phase power factor below 1.000cos
	UPFA	1000	Alarm output for A-phase power factor higher than 1.000cos
B-phase power factor	dPFb	1000	Alarm output for B-phase power factor below 1.000cos
	UPFb	1000	Alarm output for B-phase power factor higher than 1.000cos
C-phase power factor	dPFC	1000	Alarm output for C-phase power factor below 1.000cos
	UPFC	1000	Alarm output for C-phase power factor higher than 1.000cos
Total power factor	dPFS	1000	Alarm output for total power factor below 1.000cos
	UPFS	1000	Alarm output for total power factor higher than 1.000cos
A-phase apparent power	dSA	8000	Alarm output for A-phase apparent power below 8000W
	USA	8000	Alarm output for A-phase apparent power higher than 8000W
B-phase apparent power	dSb	8000	Alarm output for B-phase apparent power below 8000W
	USb	8000	Alarm output for B-phase apparent power higher than 8000W
C-phase apparent power	dSC	8000	Alarm output for C-phase apparent power below 8000W
	USC	8000	Alarm output for C-phase apparent power higher than 8000W
Total apparent power	dSS	8000	Alarm output for total apparent power below 8000W
	USS	8000	Alarm output for total apparent power higher than 8000W
Frequencyc	dFr	5000	Alarm output for three-phase frequency below 50Hz
	UFr	5000	Alarm output for three-phase frequency higher than 50Hz
OFF	doFF	OFF is to close the alarm output	

MODBUS address information table

setup information		
Address	Describe	illustrate
0x00	A-phase voltage	XXX.X V
0x01	B-phase voltage	XXX.X V
0x02	C-phase voltage	XXX.X V
0x03	A phase current	XXX.X A
0x04	B phase current	XXX.X A
0x05	C phase current	XXX.X A
0x06	Neutral current	XXX.X A

Address	Describe	illustrate
0x07	Total active power	XXXX W
0x08	A-phase active power	XXXX W
0x09	B-phase active power	XXXX W
0x0A	Phase C active power	XXXX W
0x0B	Total reactive power	XXXX Var
0x0C	A-phase reactive power	XXXX Var
0x0D	B-phase reactive power	XXXX Var
0x0E	Phase C reactive power	XXXX Var
0x0F	Total apparent power	XXXX VA
0x10	A-phase apparent power	XXXX VA
0x11	B-phase apparent power	XXXX VA
0x12	C-phase apparent power	XXXX VA
0x13	Total Power Factor	XX.XX
0x14	A-phase power factor	XX.XX
0x15	B-phase power factor	XX.XX
0x16	C-phase power factor	XX.XX
0x17	A phase-to-line voltage	XXX.X V
0x18	B-phase line voltage	XXX.X V
0x19	C phase line voltage	XXX.X V
0x1A	A-phase frequency	XX.XX HZ
0x1B	B-phase frequency	XX.XX HZ
0x1C	Phase C frequency	XX.XX HZ
0x1D	Forward active energy (high 16 bits)	XX.XX KWH
0x1E	Forward active energy (lower 16 bits)	
0x1F	Reverse active energy (high 16 bits)	XX.XX KWH
0x20	Reverse active energy (lower 16 bits)	
0x21	Forward reactive energy (high 16 bits)	XX.XX KVarh
0x22	Forward reactive energy (lower 16 bits)	
0x23	Reverse reactive energy (high 16 bits)	XX.XX KVarh
0x24	Reverse reactive energy (lower 16 bits	

Address	Describe illustrate
0x45	Reserve
0x46	Alarm output
0x47	Input signal
0x50	password (1~9999)
0x51	Communication address (1~254)
0x52	Baud rate (0:1200 1:2400 3:9600)
0x53	Check digit (0:N81 1:O81 2:E81 3:N82) none,odd,even
0x54	Reserved
0x55	Wiring method (0:3-3 1:3-4)
0x56	Maximum voltage (0:100V 1:400V)
0x57	Maximum current (0:1A 1:5A)
0x58	Reserved
0x59	PT
0x5A	CT
0x5B	Low 4 bits: 1 channel alarm output mode High 4 bits 1 channel alarm output reference object
0x5C	1 channel alarm output threshold
0x5D	Low 4 bits: 2-channel alarm output mode High 4-bit 2-channel alarm output reference object
0x5E	2-channel alarm output threshold
0x5F	Low 4 bits: 3-way alarm output mode High 4-bit 3-way alarm output reference object
0x60	3-way alarm output threshold
0x61	Low 4 bits: 4-channel alarm output mode High 4-bit 4-channel alarm output reference object
0x62	4-channel alarm output threshold
0x63	Low 4 bits: 1 channel 4-20MA output mode High 4 bits 1 channel 4-20MA output reference object
0x64	1 channel 4-20MA output threshold
0x65	Low 4 bits: 1 channel 4-20MA output mode High 4 bits 2 channels 4-20MA output reference object
0x66	2-channel 4-20MA output threshold
0x67	Low 4 bits: 3-way 4-20MA output mode High 4-bit 3-way 4-20MA output reference object
0x68	3-channel 4-20MA output threshold
0x69	Low 4 bits: 4-channel 4-20MA output mode High 4-bit 4-channel 4-20MA output reference object
0x6A	4-way 4-20MA output threshold