POLUS

INSTRUMENTOS ELÉTRICOS

Three Phase Multifunction Meter

User Manual

J12ZY

1. Product Brief introduction

The three-phase multi-function meter is designed for the electric power intelligent monitoring and electric energy metering needs of electric power system, industrial and mining enterprises, public facilities, intelligent buildings and so on, high-precision measurement of all common power parameters in three-phase grid: three-phase voltage, three-phase current, active power, reactive power, apparent power, frequency, power factor, and with 485 communication functions。

2. Technical parameter

Item			Parameter
Signal input	Wiring		3 phase 4 lines/3 phase 3 lines
	Voltage	Measurement range	AC(20~500)V
		Over load	Continuous: 1.2 multiple, instantaneous: 2 multiple/1s
		Power consumption	＜1VA（per phase)
	Current	Measurement range	AC(10mA~5A)
		Over load	Continuous: 1.2 multiple, instantaneous: 10 multiple/5s
		Power consumption	＜0.4VA（per phase)
	Frequency		45~65Hz
Power supply			AC/DC 60~280V, ≤5VA
Communication			RS485 communication interface, physical layer isolation. Meet the international standard of MODBUS-RTU agreement Communication speed 1200~38400 Test type N81,E81,081
Swithcing Input/Output			Passive dry contact
Measurement class			Power: 0. 5 Frequency: ±0. 2Hz Active power: 1. 0 Reactive power: 2. 0
Display mode			LED display, LCD display
Environment			Working temperature: -10~+45℃ Storage temperature: -25~+50℃ Relative humidity: ＜85%RH
Safety			Isolation:resistance of Signal input, power source and output terminal to cover＞100MΩ Withstand Voltage:Signal Input/power supply , Power Supply/Signal output :AC 2kV, Signal Input/Signal Output:1kV

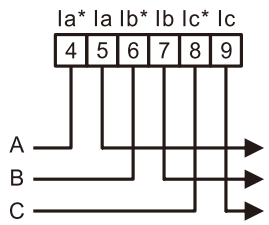
3. Installation and Wiring

3.1 Size(mm)

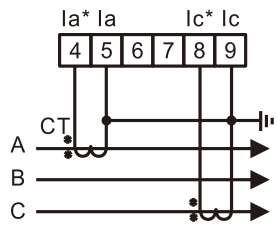
Panel Size(mm): 96×96 Hole Size(mm): 91×91 Depth(mm): 38
Panel Size(mm): 80×80 Hole Size(mm): 76×76 Depth(mm): 38
Panel Size(mm): 72×72 Hole Size(mm): 67×67 Depth(mm): 38

3.2 Wiring terminal function

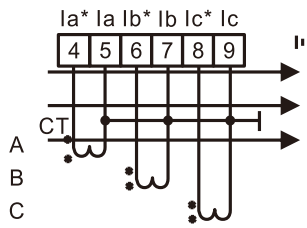
Power supply	1,2	AC/DC60 ~ 280V ≤5VA
Current signal	4,5,6,7,8,9	No.4,6,8 are the terminal of current signal input No.5,7,9 are the terminal of current signal output
Voltage signal	11,12,13,14	Three phase Voltage signal input is Ua, Ub,Uc,Un
RS485	58,59	A, B terminal
Switching input	70,71	1 loops of switching input, 70 is the common terminal



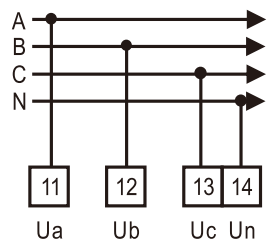
3 phase AC(without CT)



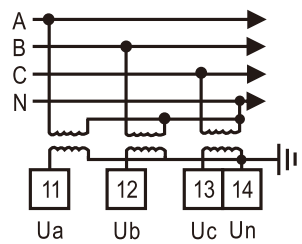
3 phase AC(2CT)



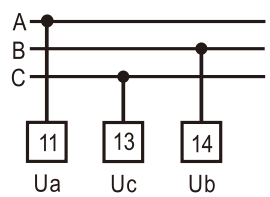
3 phase AC(3CT)



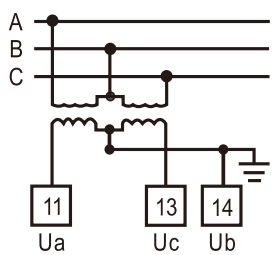
Low voltage:3 phase 4 wire AC(without PT)



High voltage:3 phase 4 wire AC(3PT)



Low voltage:3 phase 3 wire AC(without PT)



High voltage:3 phase 3 wire AC(2PT)

Note: The meter is provided with two kinds of wiring modes, please make sure the actual wiring is same to the set wiring in the meter.
The wiring diagram and technical parameter printed on the product shall be prevailed.

4. Programme operation

Under programming status, digital interface adopts layered structure menu type ,meter supply three lines digital display.

No.1 line is first layer menu information.

No.2 line is second layer menu information,

No.3 line is third layer menu information.

For example: No.1 line: INPT means signal input.

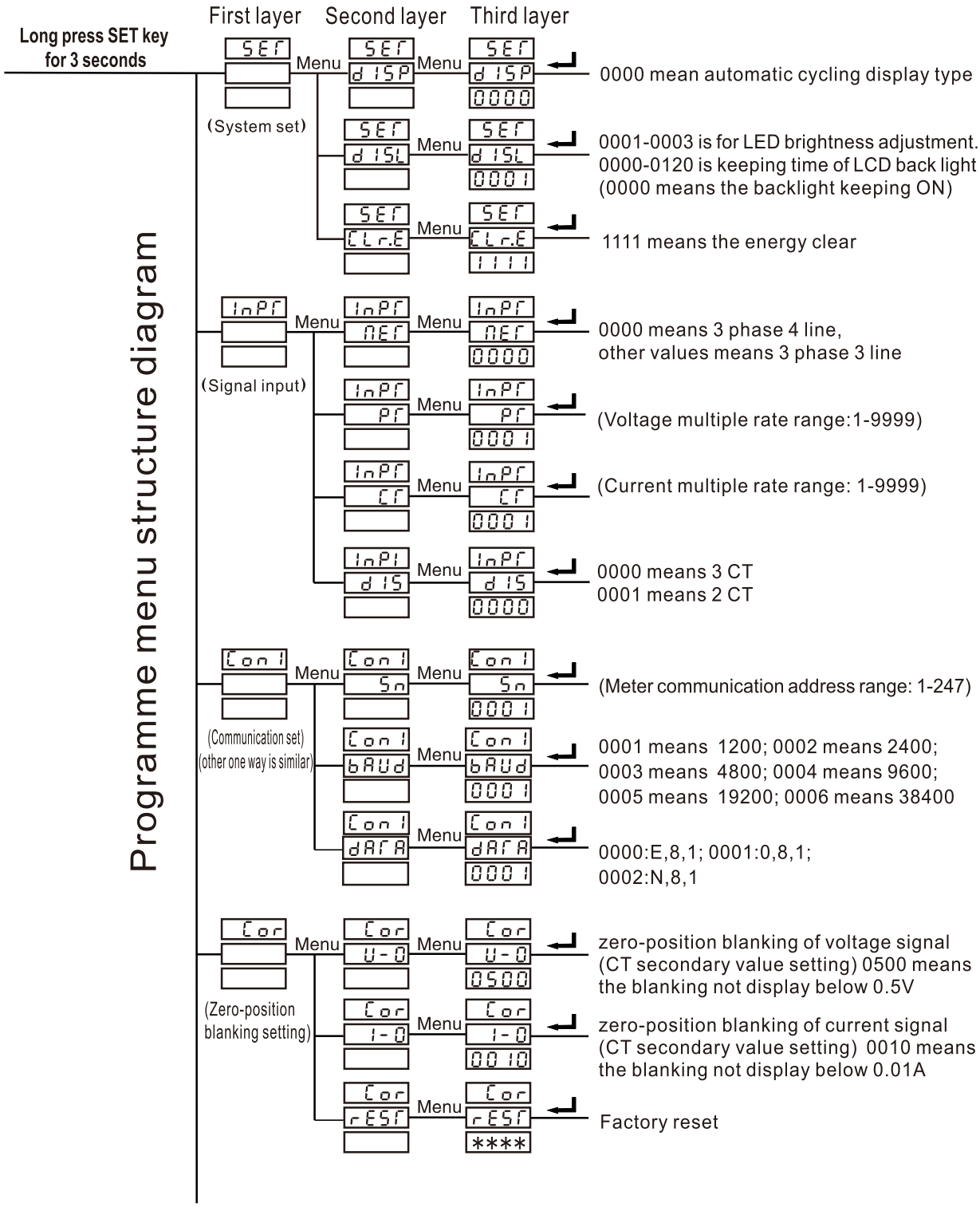
No.2 line:CT current ratio No. 3 line: 5 means the CT value. CT value=25/5A=5.

Parameter setting can be customized according to requirements.

No.1 layer	No.2 layer	No.3 layer	Description
System set "SET"	Display DISP	0000-0014	0000 means automatic cyclingdisplay
	DISL	0001-0003 or 0000-0120	0001-0003 is for LED brightness adjustment 0000-0120 is keeping time of LCD back light
	Energy clear CLr.E	1111	1111 means the energy clear, other values are invalid
Signal input INPT	Wiring mode NET	0000 or other values	0000 means 3 phase 4 line, other values means 3 phase 3 line
	Voltage transformation ratio PT	1 ~ 9999	PT value= PT primary value/ secondary value
	Current transformation ratio CT	1 ~ 9999	CT value= CT primary value/ secondary value
Communication set CONi (i is 1~2)	address SN	1 ~ 247	Meter address range: 1-247
	Communication speed BAUD	0001 ~ 0006	0001为1200； 0002为2400； 0003为4800； 0004为9600； 0005为19200；0006为38400
	Data format DATA	0000 ~ 0002	0000:E,8,1； 0001:0,8,1； 0002:N,8,1；

Note: The above menu is applied to the product with complete function.If you find there is no such menu in the product or the menu is not working, It means the product not supporting the function.

Programming step



Operation instruction:

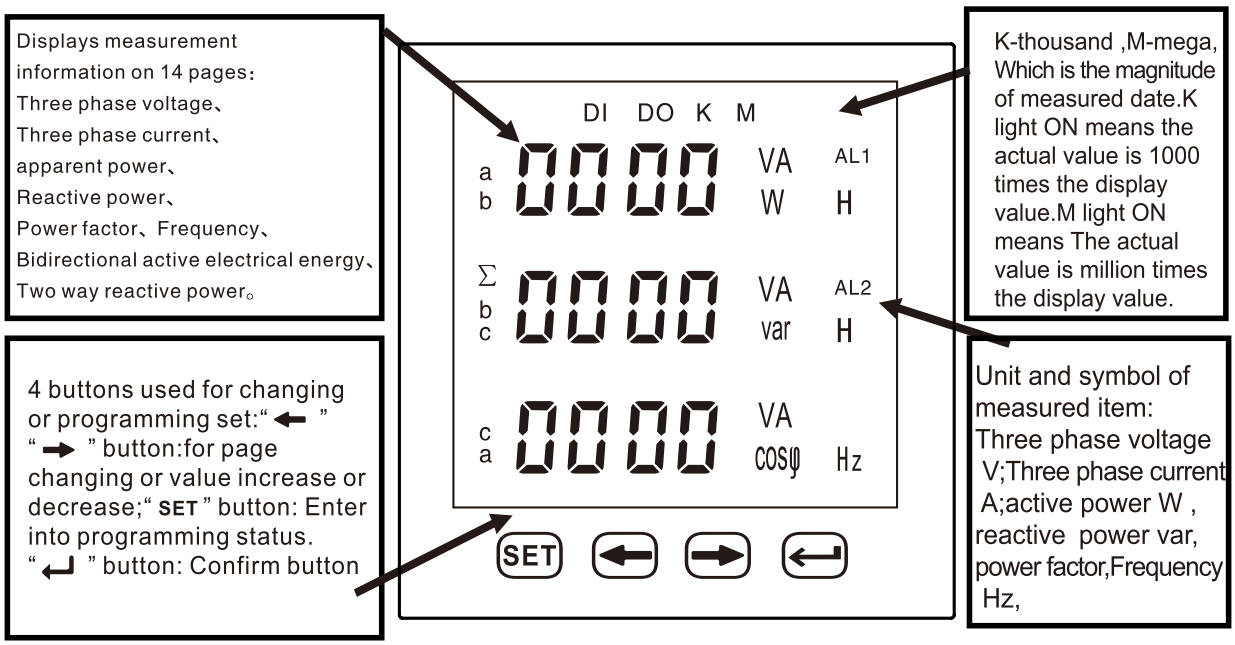
(a) After revised the data of third layer (or option), need press " ↵ " button to back the second menu then the setting take effect.

(b)The wiring method can be revised refer to the actual wiring mode.

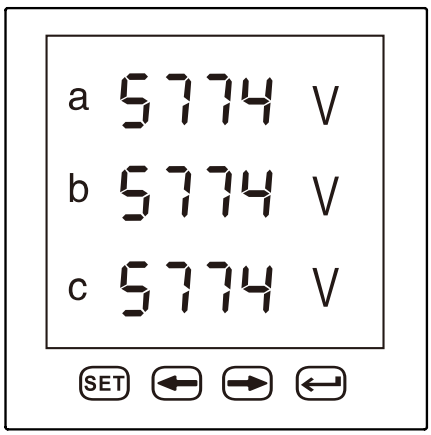
(c)Under normal condition, the label of product have remarked the model parameter and factory setting parameter. The user can reset the parameters according to the requirements.

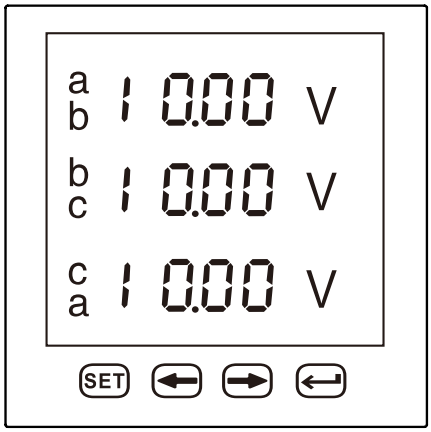
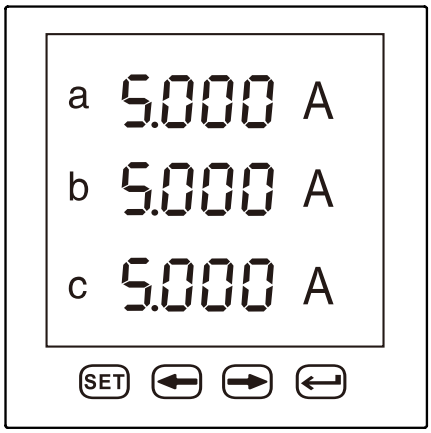
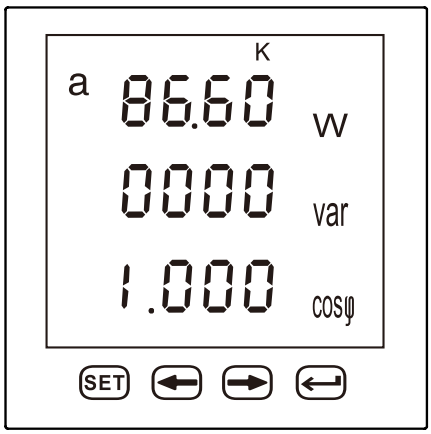
(d) After revise the value , through " ← " button and " → " button to increase or decrease , through" **SET** " button to move.

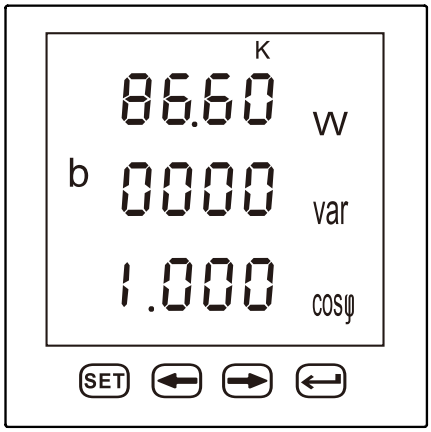
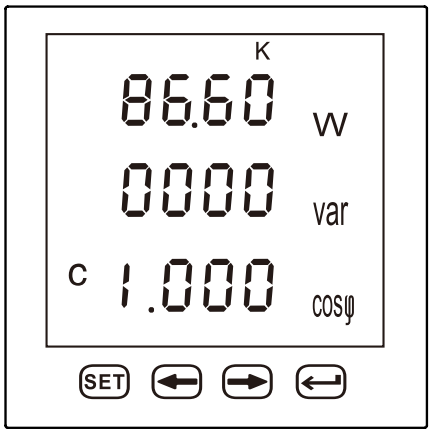
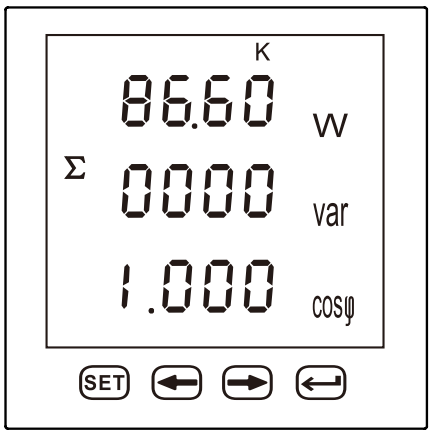
5. Panel explain and measurement information display (1) Panel instructions

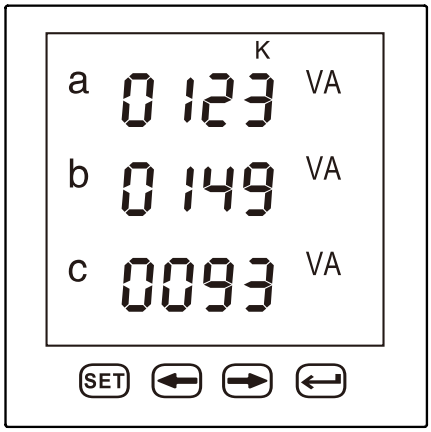
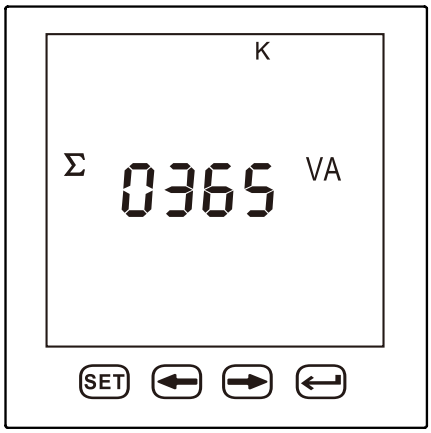
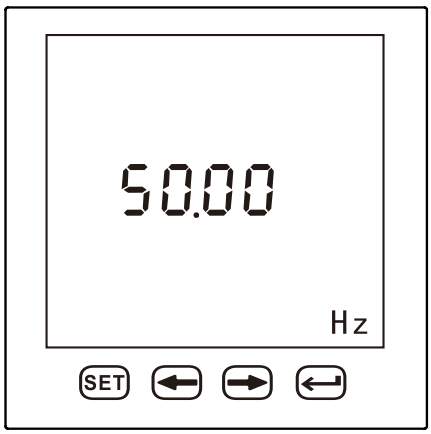


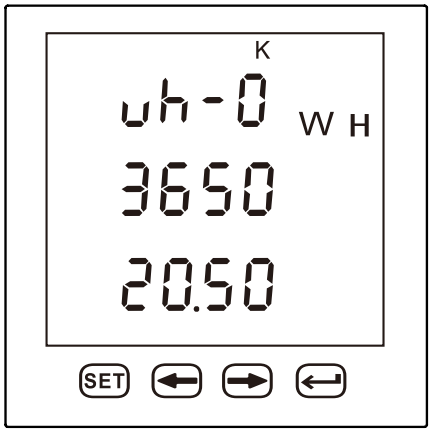
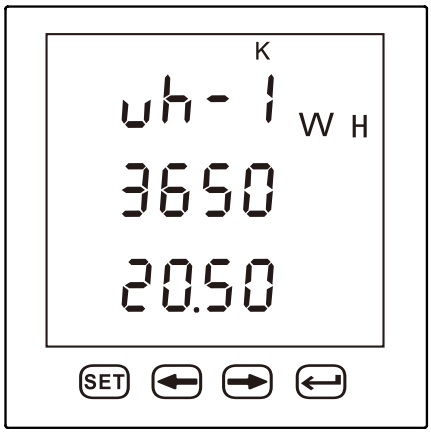
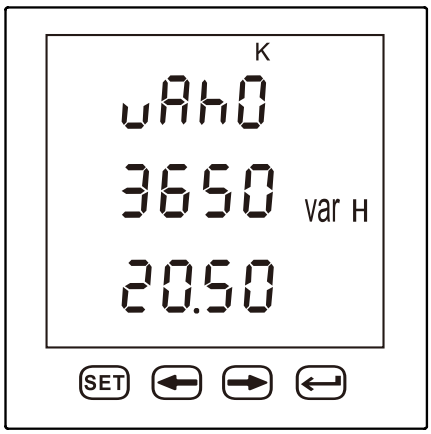
(2) The contents of displayed page

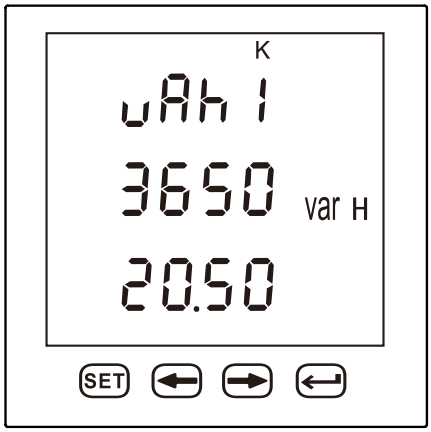
Page	Content	Explanation
DISP=1 three phase voltage		Separately display the voltage Ua, Ub, Uc (3 phase 4 line), positive active energy. In left Fig Ua=5774V Ub=5774V Uc=5774V

Page	Content	Explanation
DISP=2 three phase voltage		Separately display the voltage Uab, Ubc, Uca (line voltage), In left Fig Uab=10kV Ubc=10kV Uca=10kV
DISP=3 three phase current		Display 3-phase current Ia, Ib, Ic, the unit is A. In left Fig Ia=5A Ib=5A Ic=5A
DISP=4 A phase separation Active Power Reactive power Power factor		Show a phase separation Active Power Pa Reactive power Qa Power factor PFa Left Pa=86.6kW Qa=Ovar PFa=1.0

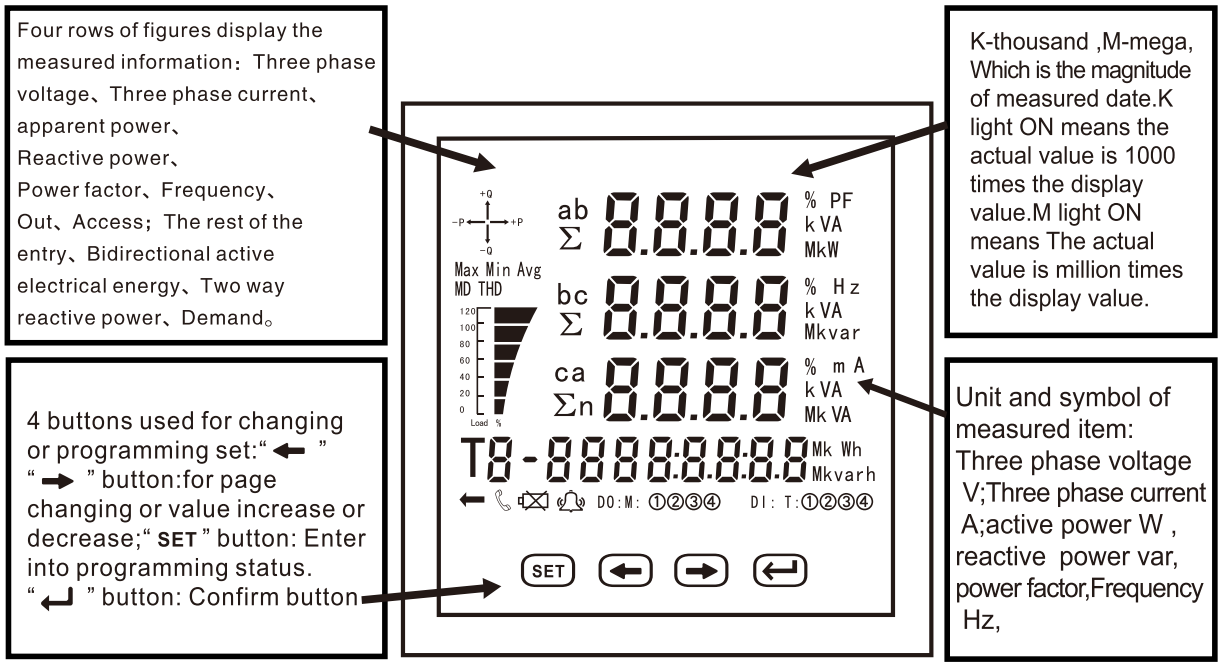
Page	Content	Explanation
DISP=5 B phase separation Active Power Reactive power Power factor		Show b phase separation Active Power Pb Reactive power Qb Power factor PFb Left Pb=86.6kW Qb=Ovar PFb=1.0
DISP=6 C phase separation Active Power Reactive power Power factor		Show c phase separation Active Power Pc Reactive power Qc Power factor PFc Left Pc=86.6kW Qc=Ovar PFc=1.0
DISP=7 Three phases total Active Power Reactive power Power factor		Display three phase total Active Power P Reactive power Q Power factor PF Left P=86.6kW Q=Ovar PF=1.0

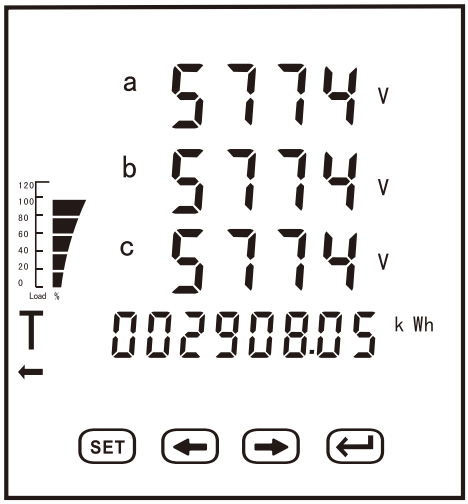
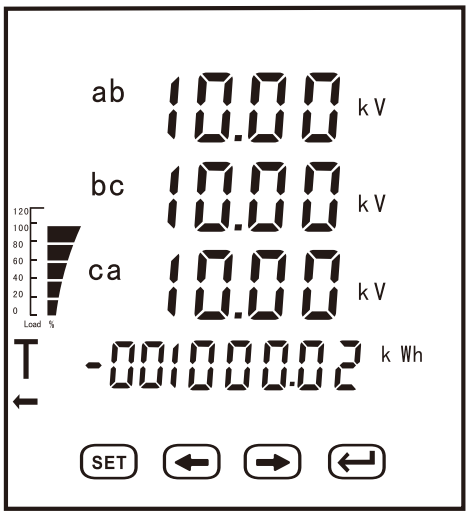
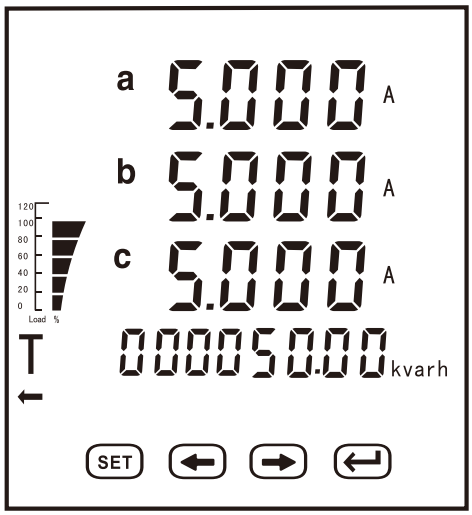
Page	Content	Explanation
DISP=8 A□B□C Three phase Apparent Power		Display the apparent power separately Sa、Sb、Sc Left Sa=123VA Sb=149VA Sc=93VA
DISP=9 Three phases total Apparent Power		Display three phase total Apparent Power S Left S=365VA
DISP=10 Frequency		The left diagram shows the present power grid frequency is 50.00Hz

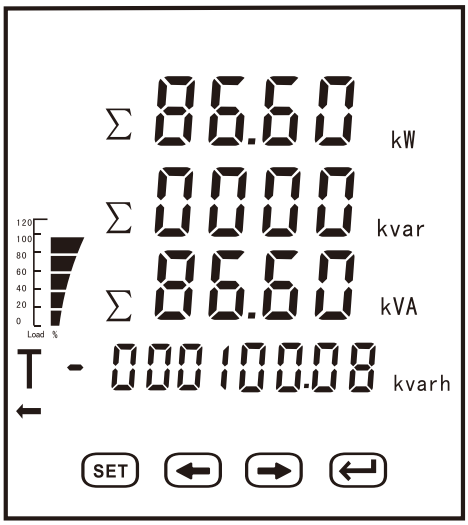
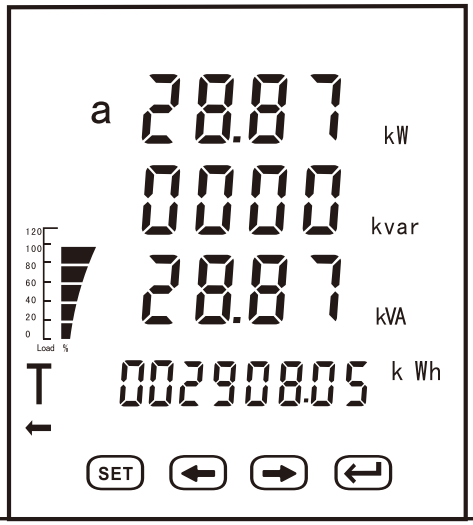
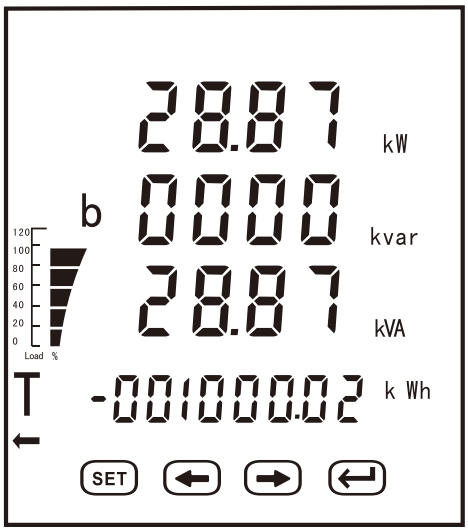
Page	Content	Explanation
DISP=11 Positive active energy		The left image shows the value of positive active power, The 2nd row is the higher 4 bits, The 3rd row is the lower 4bits, to form a complete 8–bit value。 The left chart shows the value of positive active power :365020.50kW h.
DISP=12 Negative active energy		The left image shows Negative active energy values, The 2nd row is the higher 4 bits, The 3rd row is lower 4 bits, to form a complete 8 bit value。 The left chart shows the negative active power value is 365020.50kW h.
DISP=13 Positive reactive power		The left image shows the positive reactive energy values, The 2nd row is the higher 4 bits, The 3rd row is the lower 4 bits, to form a complete 8–bit value The left chart shows the value of positive reactive power 365020.50kvarh.

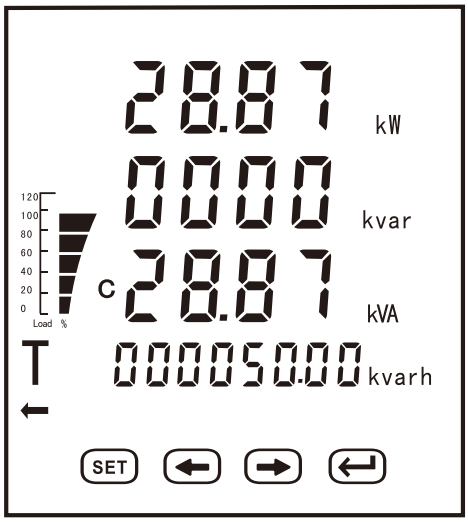
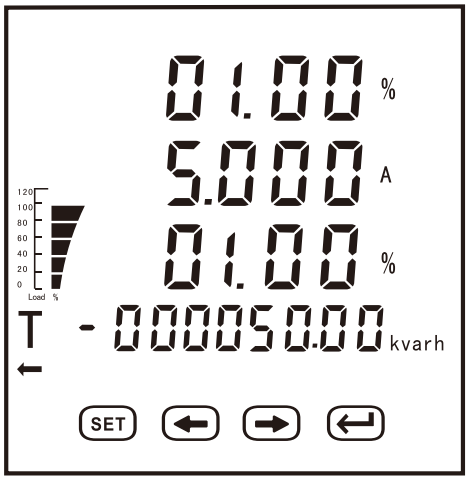
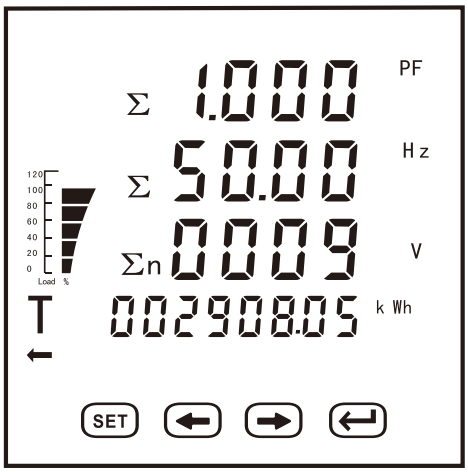
Page	Content	Explanation
DISP=14 Reverse reactive power		The left panel shows the reverse reactive power values,The 2nd row digital tube is 4 bits high， Row 3 is four places lower, Form an 8-bit value。 The left–hand chart shows the value of reverse reactive power 365020.50kvarh.

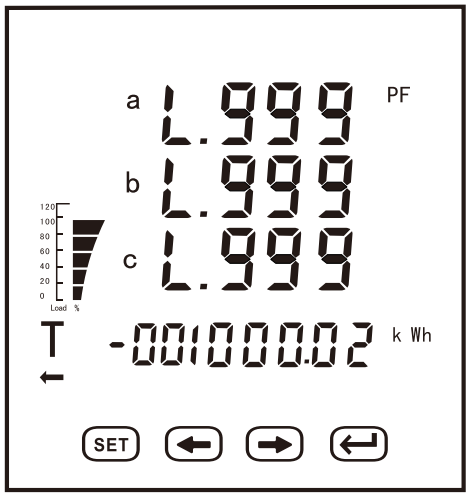
(2) Panel description(LCD liquid crystal display)



Page	Content	Explanation
DISP=1 three phase voltage Positive active energy		Separately display the voltage Ua, Ub, Uc (3 phase 4 line), positive active energy. In left Fig Ua=5774V Ub=5774V Uc=5774V Positive active energy =2908,05kWh
DISP=2 three phase voltage Negative active energy		Separately display the voltage Uab, Ubc, Uca (line voltage), negative active energy. In left Fig Uab=10kV Ubc=10kV Uca=10kV Negative active energy =1000.02kWh
DISP=3 three phase current Positive reactive energy		Display 3-phase current Ia, Ib, Ic, the unit is A. Positive reactive energy In left Fig Ia=5A Ib=5A Ic=5A Positive reactive energy =50.00kvarh

Page	Content	Explanation
DISP=4 Total active power Total reactive power Total apparent power Negative reactivepower		Total active power =86.60kW Total reactive power =0000kvar Total apparent power =86.60kVA Negative reactive power =100.08kvarh
DISP=5 A phase active power A phase reactive power A phase apparent power Positive active power		A phase active power =28.87kW A phase reactive power =0000kvar A phase apparent power =28.87kVA Positive active power =2908.05kWh
DISP=6 B phase active power B phase reactive power B phase apparent power Negative active power		B phase active power =28.87kW B phase reactive power =0000kvar B phase apparent power =28.87kVA Negative active power =1000.02kWh

Page	Content	Explanation
DISP=7 C phase active power C phase reactive power C phase apparent power Positive reactive power		C phase active power =28.87kW C phase reactive power =0000kvar C phase apparent power =28.87kVA Positive reactive power =50.00kvarh
DISP=8 Current Unbalance Average current Voltage Unbalance		Displayed in left Fig Current Unbalance:1% Average current=5A Voltage Unbalance:1% Negative Reactive Energy =50.00kvarh
DISP=9 Three phase total power factor, Frequency, Average Voltage		Displayed in left Fig Three phase total power factor =1.000 Frequency=50Hz Average Voltage=9V positive active energy =2908.05kWh

Page	Content	Explanation
DISP=10 Power factor for each phase		Displayed in left Fig A phase power factor =0.999 B phase power factor =0.999 C phase power factor =0.999 Negative active energy =1000.02kWh

Version No:2305

POLUS

INSTRUMENTOS ELÉTRICOS

Three phase AC current/voltage meter User Manual

J04ZY

1、Product Introduction

The three-phase AC current/voltage meter is designed for power systems, industrial and mining enterprises, public facilities, and intelligent large

Designed for the needs of intelligent power monitoring and energy metering in Xiamen and other occasions, capable of high-precision measurement of three-phase

All commonly used power parameters in the power grid: three-phase voltage, three-phase current, frequency, and equipped with 485 communication.

2、Technical Parameter

Project			Parameters
Signal input	Connection		Three phase three wire/three phase four wire
	Voltage	range	100V，380V
		overload	Continuous: 1.2x, instantaneous: 2x/1S
		consumption	＜ 1VA (per phase)
	Current	range	AC(10mA ~ 5A)
		overload	Continuous: 1.2x, instantaneous: 10x/5S
		consumption	＜1VA
	Frequency		(45 ~ 65)Hz
Power supply			AC/DC60 ~ 280V、 ≤5VA
Communication			Rs485 communication interface, physical layer isolation MODBUS-RTU protocol that meets international standards Communication speed 1200~38400 Verification methods N81, E81, 081
Accuracy			Electric parameters: 0.5 class, frequency: ± 0.2Hz
Display method			LED digital tube display, LCD liquid crystal display
Environment			Working temperature: -10~+45 ℃ Storage temperature: -25~+50 ℃ Relative humidity: ＜ 85% RH
Security			Insulation: input, power supply, and output terminals have a resistance to the shell greater than 100M Ω Withstand voltage: input/power: 2kV, power/output: 2kV, Input/output: 1kV

3、Installation and wiring

3.1Size (mm)

Face frame size 96 * 96, opening size 91 * 91, cabinet entry depth 38

Face frame size 80 * 80, opening size 76 * 76, cabinet entry depth 38

Face frame size 72 * 72, opening size 67 * 67, cabinet entry depth 38

3.2 Functional Description of Wiring Terminals

Power supply	1,2	AC/DC60～280V、 ≤5VA
Current signal	4,5,6,7,8,9	4,6,8 are the three-phase current input terminals 5,7,9 are the three-phase current output terminals
voltage signal	11,12,13,14	Respectively for three-phase voltage input Ua, Ub, Uc, Un
RS485	58,59	Respectively A and B

Instructions for use

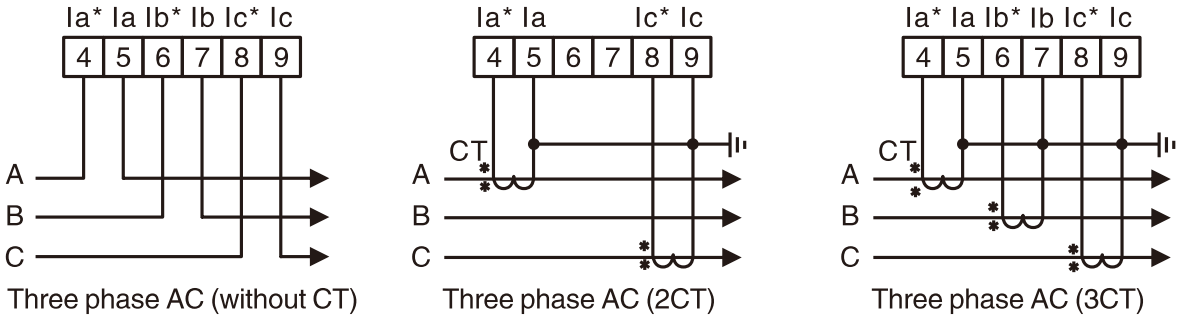
(a) 1 and 2 are auxiliary power supplies for instrument operation. Please ensure that the power supply is suitable for this series of products to prevent damage to the products.

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

(c) Three phase three wire connection method: In a three phase three wire network, the B phase current does not need to be connected, and Ub is connected to terminal 14. The specific wiring can refer to 3.3 wiring.

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

3.3 Wiring (see Figure 1 and Figure 2)



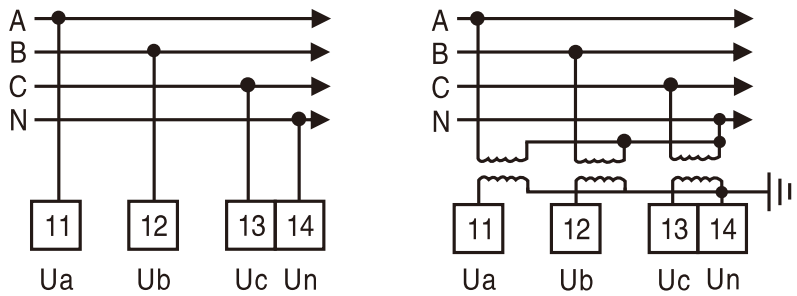
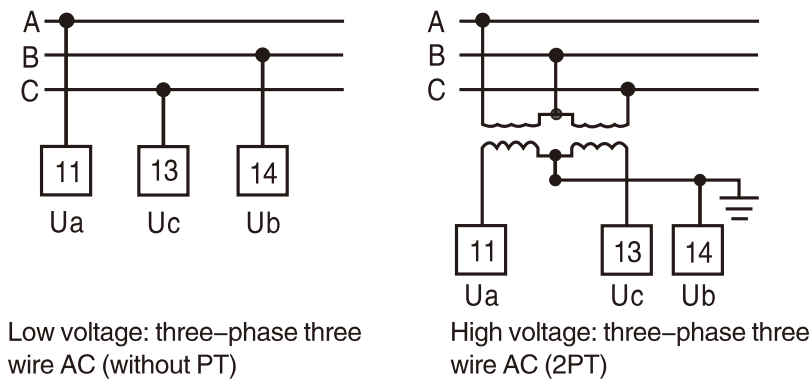


Figure 1



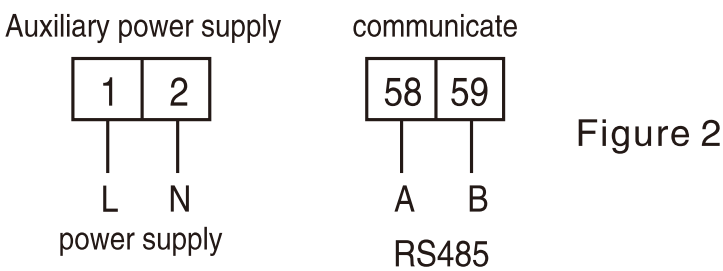
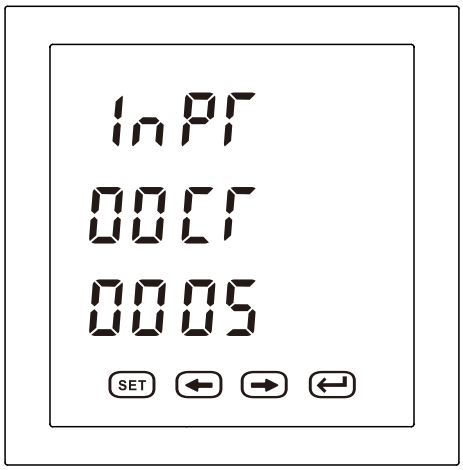


Figure 2

Attention: Two wiring methods can be set inside the instrument,and the actual wiring method and the setting method inside the instrument must be consistent, otherwise the measurement data of the instrument will be inaccurate. The specific wiring method shall be based on the product's random wiring diagram.

4、Programming Operations

In programming mode, the digital display interface adopts a hierarchical menu structure, and the instrument
The table provides three rows of numerical displays:
The first row is the first layer of menu information;
The second row is the second layer of menu information;
The third row is the third layer of menu information;
As shown in the following figure:
Layer 1: INPT signal input, Layer 2: CT current ratio
Layer 3: 5 represents the current CT value,
Set the current specification CT value to 25/5A=5.

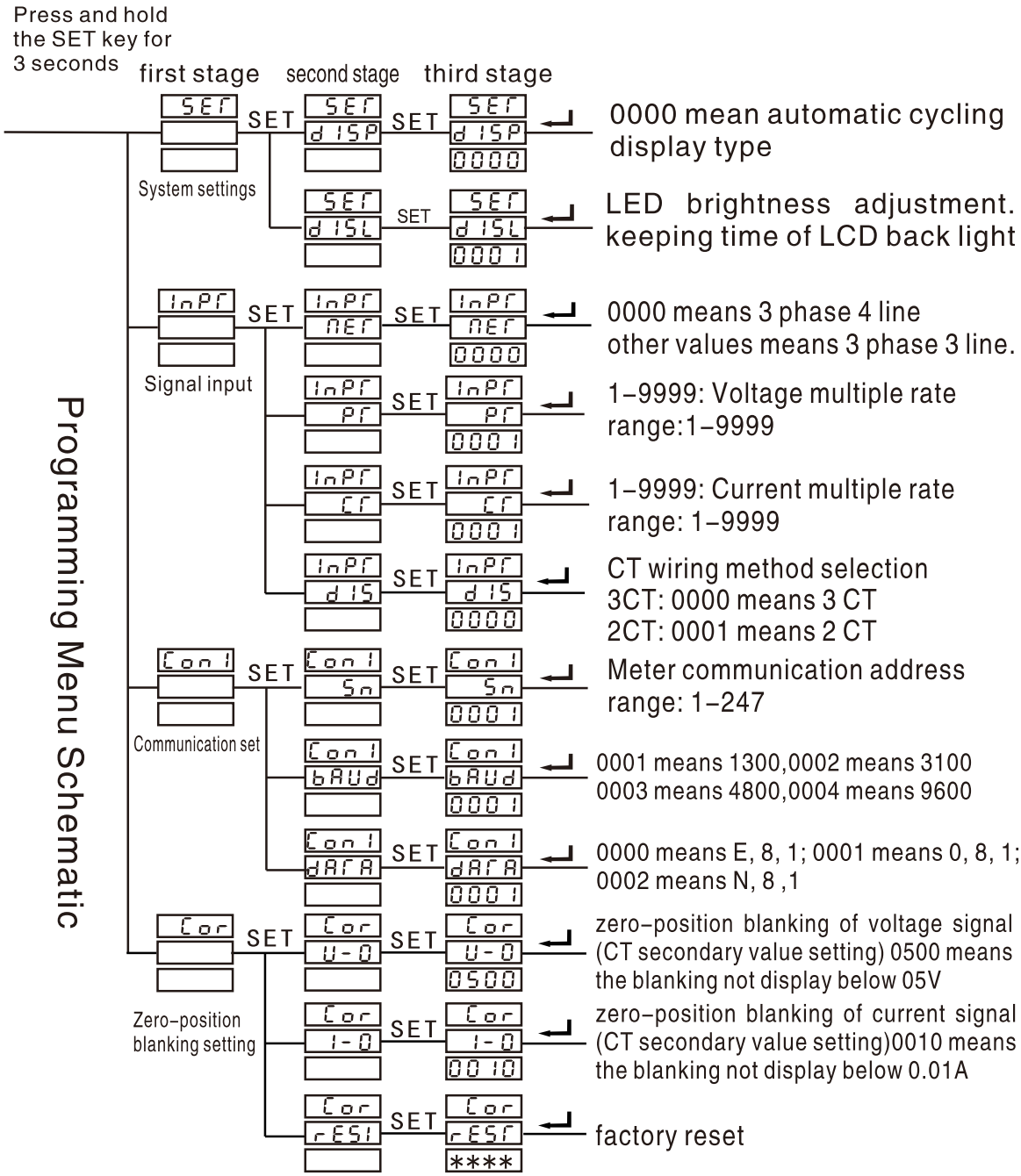


The organizational structure of the digital display interface menu is as follows, and users can choose appropriate setting parameters according to their actual situation.

Tier 1	Tier 2	Tier 3	Describe
System settings SET	Page display DISP	0000 ~ 0003	0000 indicates automatic cycle display mode
	Backlight display time DISL	0001 ~ 0003 or 0000 ~ 0120	0001~0003 are LED digital tube brightness adjustments 0000~0120 are LCD backlight displays Hold time (0000 is the backlight always on)
Signal input INPT	Wiring method NET	0000 or other values	0000 represents three-phase four wire Other values represent three-phase three wire
	Voltage ratio PT	1 ~ 9999	PT value=primary/secondary value of transformer
	Current ratio CT	1 ~ 9999	CT value=primary/secondary value of transformer
Communication settings CONi(i is 1-2)	Mailing address SN	1 ~ 247	Instrument address range: 1-247
	Communication speed BAUD	0001 ~ 0006	0001or1200; 0002or2400; 0003or4800; 0004or9600; 0005or19200; 0006or38400
	Communication check bit DATA	0000 ~ 0002	0000:E,8,1; 0001:0,8,1; 0002:N,8,1;

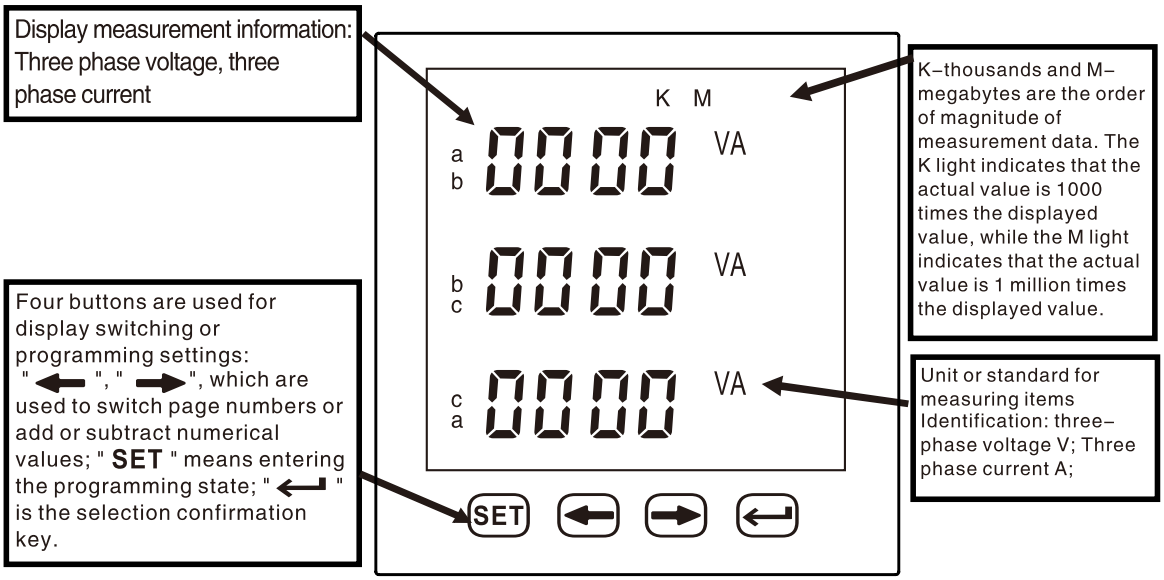
Note: The above menu items are all functional menu items. If the user finds that some menu items in the menu are missing or ineffective compared to the above table during use, it indicates that the product selected by the user does not support this function.

4.1 Programming steps



5、Panel Description and Measurement Information Display

5.1 Digital display



6、 Transportation and storage

6.1 The transportation and unpacking of products should not be subjected to strong impact. They should be transported and stored in accordance with the provisions of GB/T 25480–2010 "Basic Environmental Conditions and Test Methods for Transportation and Storage of Instruments and Meters", and placed according to the requirements on the packaging box.

6.2 Store the product in its original packaging, with a storage environment temperature of –25 ℃~+50 ℃ and an average relative humidity of no more than 85%. The storage environment should be free of corrosive gases and should be moisture–proof.

6.3 The product should be stored in the warehouse and placed on a shelf, with a stacking height of no more than 6 boxes for unpacking
Afterwards, the stacking height of a single packaged product shall not exceed 10 pieces.

6.4 Shell caused by severe impact or falling from high altitude during transportation, use, and installation
When there are obvious signs of damage, please do not power up the corresponding meter and contact the supplier as soon as possible.

7、 Company commitment

Within 18 months from the date of production of the product, during normal customer storage, transportation, maintenance, and use,
If the company seal is intact and not removed, it cannot be used normally due to manufacturing issues with the product
Provide "three guarantees" service during usage.

POLUS

INSTRUMENTOS ELÉTRICOS

Single phase AC current/voltage meter User Manual

J02ZY

1、Product Introduction

A single–phase AC current/voltage meter is designed for the intelligent monitoring and energy metering needs of power systems, industrial and mining enterprises, public facilities, intelligent buildings, and other occasions. It can measure voltage and current parameters in single–phase power grids with high accuracy and is equipped with a 1–channel communication interface.

2、Technical Parameter

project			Parameters
Connection			single phase
INPUT	voltage	range	AC：100V、380V、 600V
		overload	Continuous: 1.2 times Instantaneous: 2 times
		consumption	＜1VA
	current	range	AC：1A、5A
		overload	Continuous: 1.2 times Instantaneous: 2 times
		consumption	＜1VA
	Frequency		(45～65)Hz
Power supply			AC/DC60～280V、 ≤5VA
Communication			RS485 communication interface, physical layer isolation MODBUS–RTU protocol that meets international standards Communication speed 1200~38400 Verification methods N81, E81, 081
Measurement level			Electric quantity: 0.5, frequency: ± 0.2Hz
Display method			LED digital tube display, LCD liquid crystal display
environment			Working temperature: –10~+45 ℃ Storage temperature: –25~+55 ℃ Relative humidity: ＜ 85% RH
Security			Insulation: Resistance of input, power supply, and output terminals to the housing > 100M Ω Withstand voltage: input/power: 2kV, power/output: 2kV, input/output: 1kV

3、Installation and wiring

3.1Size (mm)

Face frame size 96 * 96, opening size 91 * 91, cabinet entry depth 38

Face frame size 80 * 80, opening size 76 * 76, cabinet entry depth 38

Face frame size 72 * 72, opening size 67 * 67, cabinet entry depth 38

3.2 Functional Description of Wiring Terminals

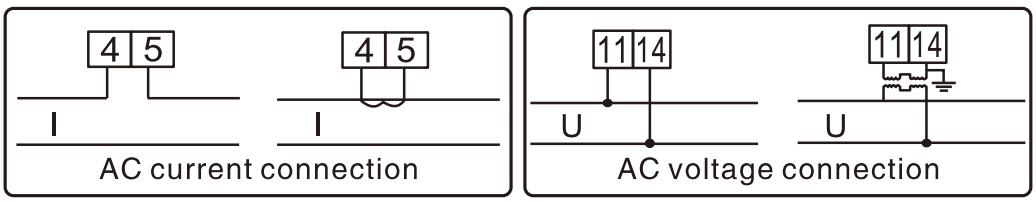
Power supply	1,2	AC/DC60～280V、 ≤5VA
current signal	4,5	4 is the current input terminal
voltage signal	11,14	11 represents the high end of the voltage and 14 represents the low end of the voltage
RS485	58,59	Respectively A and B

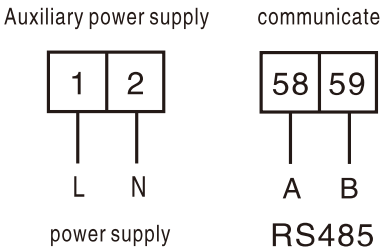
Instructions for use

(a) 1 and 2 are auxiliary power supplies for instrument operation. Please ensure that the power supply is suitable for this series of products to prevent damage to the products.

(b) 4 represents the incoming terminal of the current transformer, and the terminal marked with * represents the incoming terminal of the current.

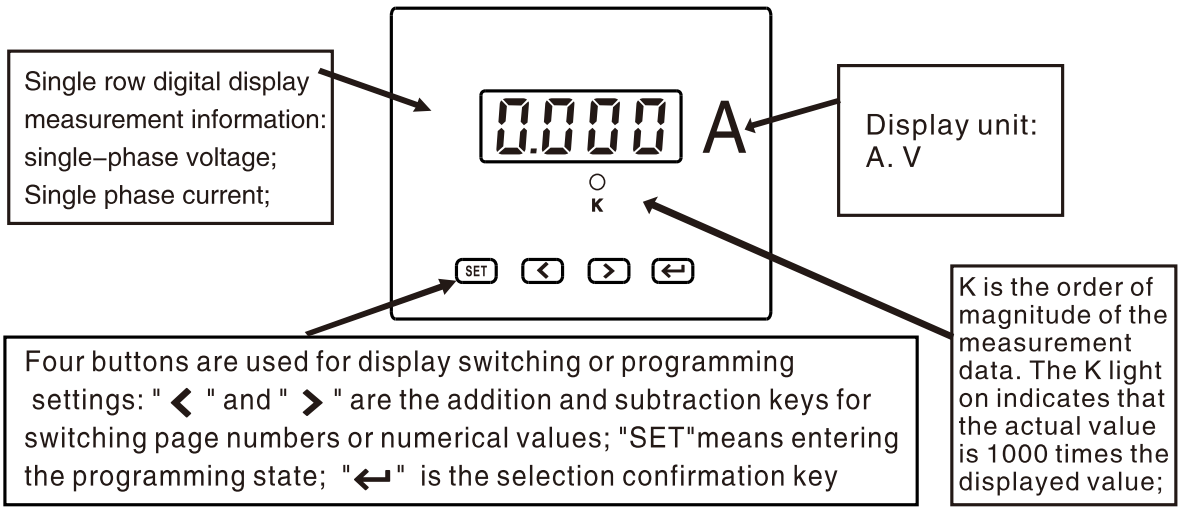
3.3 Wiring diagram



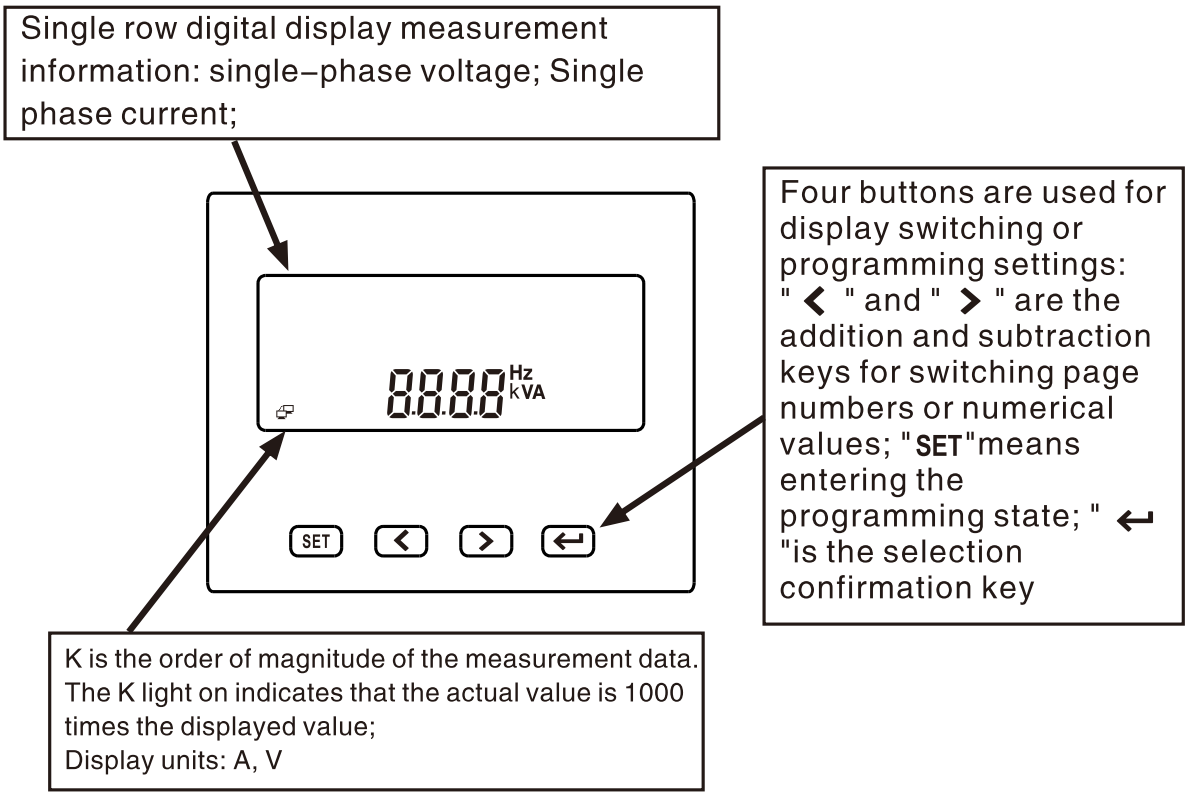


4、 Panel Description and Measurement Information Display

4.1 LED digital tube display



4.2 LCD display



4.3 Page Display Content

page	content	illustrate
DISP=1 voltage		voltage=220.0V
DISP=2 current		current=5.000A

5、 Programming Operations

In programming mode, the digital display interface adopts a hierarchical menu structure, and the instrument provides a single row of digital display:

The first level is the first level of menu information;

The second level is the second level menu information;

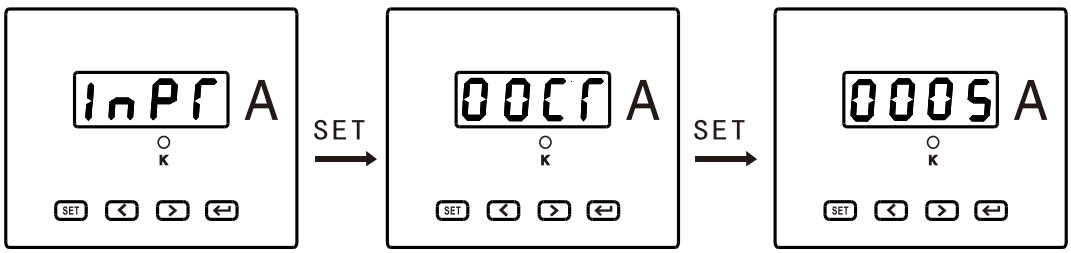
The third level is the third level of menu information.

As shown in the following figure:

Level 1: INPT signal input

Level 2: CT current ratio

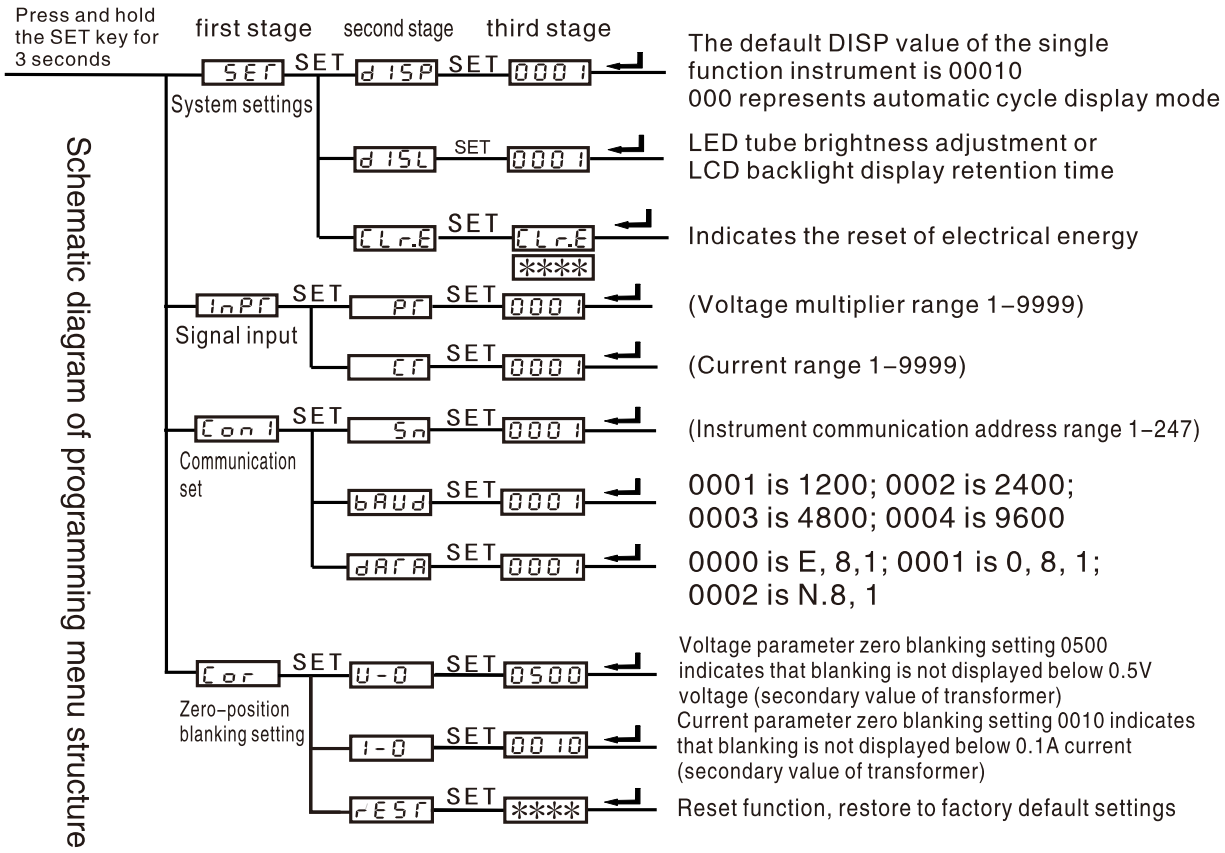
Level 3: 5 current CT value, set to current specification CT=25/5A=5.



The organizational structure of the digital display interface menu is as follows, and users can choose appropriate setting parameters according to their actual situation.

Tier 1	Tier 2	Tier 3	Describe
System settings SET	Page Display DISP	0001	The default DISP value of the single function instrument is 0001
	Brightness/backlight display time DISL	0001–0003 or 0000–0120	0001~0003 are LED tube brightness adjustment 0000~0120 is the LCD backlight display holding time (0000 is the backlight always on)
Signal input INPT	Voltage ratio PT	1 ~ 9999	PT value=primary/secondary value of transformer
	Current ratio CT	1 ~ 9999	CT value=primary/secondary value of transformer
communication CONL	address SN	1 ~ 247	Instrument address range: 1–247
	Communication speed BAUD	0001 ~ 0006	0001 is 1200; 0002 is 2400; 0003 is 4800; 0004 is 9600; 0005 is 19200; 0006 is 38400;
	Communication check bit DATA	0000 ~ 0002	0000:E,8,1; 0001:0,8,1; 0002:N,8,1;

5.1 Programming steps



Operating instructions:

(a) After changing the data (or options) of the third level menu, press “ ↵ ”

The key must be pushed back to the second level menu to take effect.

(b) The wiring method can be modified according to the actual on–site wiring method.

(c) In general, the label behind the instrument already indicates the class of the instrument

Type parameters, users can also reprogram and set the instrument according to actual needs.

(d) When changing values, use the “ < ” and “ > ” keys to increase or decrease

Small, shift through the "SET" key.

6.2 Example of alarm setting:

6、Transportation and storage

6.1 The transportation and storage of instruments should be in accordance with Chapter 4 of GB/T 25480–2010 "Basic Environmental Conditions and Test Methods for Transportation and Storage of Instruments and Meters". The storage environment temperature should be between –25 ℃ and+50 ℃, with a relative humidity not exceeding 85%, and the harmful substances in the air should not be sufficient to cause corrosion of the instruments.

6.2 The product should be stored in the warehouse and placed on a shelf with a stacking height of no more than 6 boxes. After unpacking, the stacking height of a single packaged product should not exceed 10.

6.3 Please do not power on the meter and contact the supplier as soon as possible when there are obvious signs of damage to the casing caused by severe impact or falling from a height during transportation, use, and installation.

7、Company commitment

7.1 Within 24 months from the date of production of the product, if the customer's normal storage, transportation, maintenance, and use, and the company's seal is intact and not removed, and the product cannot be used normally due to manufacturing issues, the "three guarantees" service shall be provided.

POLUS

INSTRUMENTOS ELÉTRICOS

RS485 Protocol

JZY

1. Protocol

1. 1 Physical layer

1.1.1 RS485 communication port, asynchronous half-duplex mode;

1.1.2 Communication speed 1200-38400bps can be set, factory default 9600dps;

1.1.3 Byte transfer format: 1 bit for initial bit, 8 bit for data bits, odd-even check (N81, E81, 081 can be selected), factory default N81.

1.2 Digital communication protocol

The meter is provided with serial asynchronism half-duplex RS485 communication port, adopt MODBUS-RTU protocol, various data can be transferred through communication line. One line can connect 32pcs meter at the same time, each meter can set different communication address. The communication terminal number of different series meters is different. communication should be connected by the shielded twisted-pair cable with copper network, and the diameter not less than 0.5mm^2.When wiring, keep the communication wire away from strong electric cables or other strong electric field, T type network Wiring is recommended (see Fig.1),Star-type or other wring is not recommended.

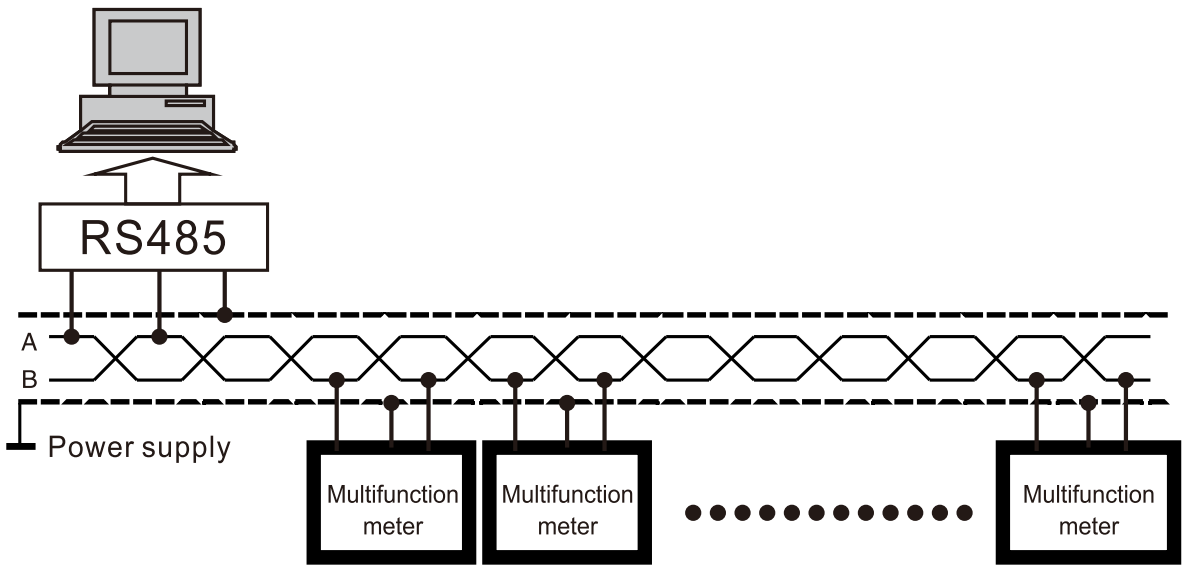
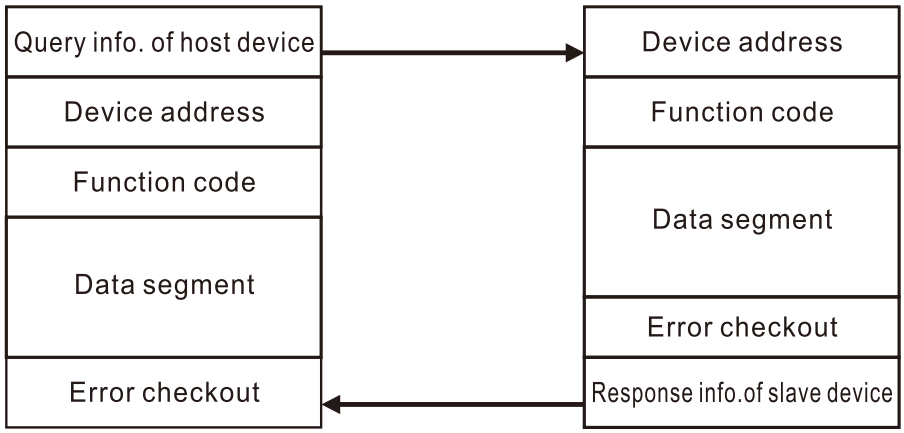


Fig.1

MODBUS-RTU communication protocol:

MODBUS protocol adopt host-slave response mode in one communication line. The signal of host computer addressing to the terminal device (Slave computer) with one address, then the terminal device send response signal back to host computer in the opposite direction. In one communication line, the communication data flow is transmitted in two opposite directions. (half-duplex working mode). MODUBUS protocol only allow the communication between Host computer (PC,PLC, etc) and terminal device(see Fig.11), not allow the data exchange between terminal devices, so each terminal device will not occupy the communication lines when initialized, but only response the query signal to the host computer.

Table 1



Host PC enquiry:

The query information frames include device address code, function code, data information code ,checkout code. The address code indicate the selected slave PC device; The function code indicate the executed function of selected slave device, for example, function code 03 or 04 means that the slave device will read the register and send back the content; The data segment include the other additional information of executed function, for example, in reading command, reading from which register? How many register to be read? The checkout code used for checking the correctness of one frame information, providing the information verification method for slave device, it adopts CRC 16 checkout rules.

Slave PC response:

If slave PC respond normally, the information include the slave address code, function code, data code and CRC 16 checkout code. Data code include the collected data from slave device, for example, register value or status. If the error occurs, the slave device will not respond. The transmission mode means one series independence data structure in one data frame and the rules for data transmission. The below defines the transmission mode compatible with MODBUS protocol RTU mode. Each bit of byte: 1 start bit, 8 data bit,(odd-even check bit),1 stop bit (with odd-even check bit) or 1 stop bit (without odd-even check bit).

Data frame structure (Message format) see Table 2

Table 2

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

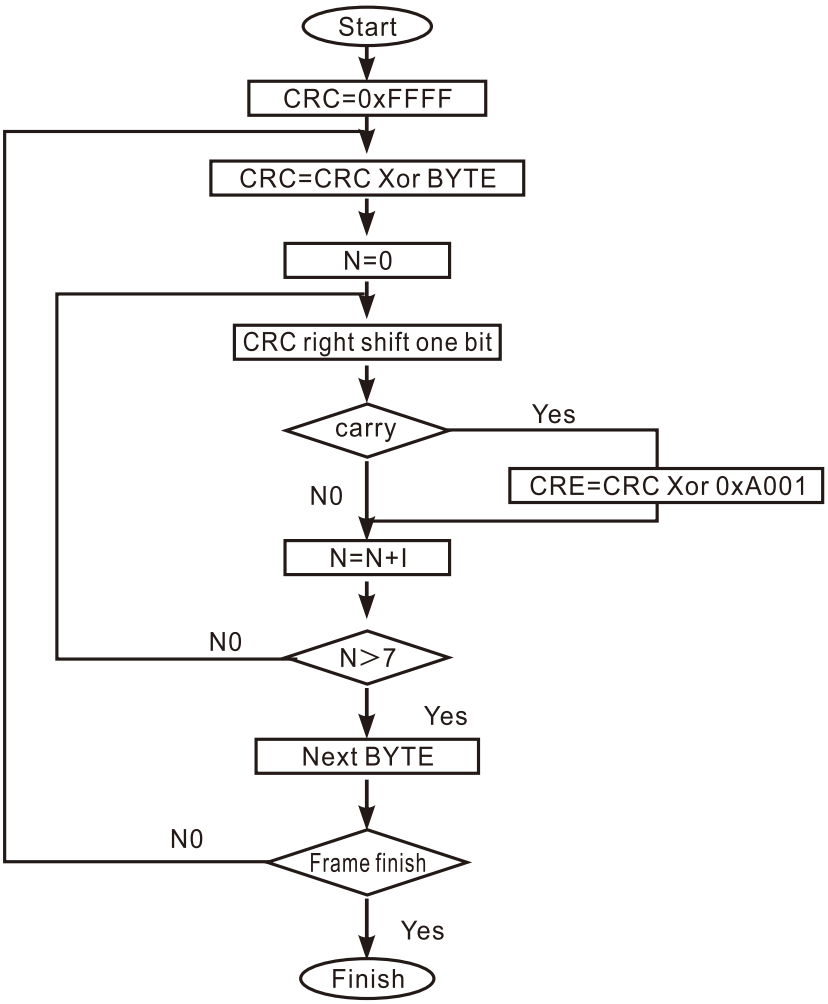
Slave PC response:
If slave PC respond normally, the information include the slave address code, function code, data code and CRC 16 checkout code. Data code include the collected data from slave device, for example, register value or status. If the error occurs, the slave device will not respond. The transmission mode means one series independence data structure in one data frame and the rules for data transmission. The below defines the transmission mode compatible with MODBUS protocol RTU mode. Each bit of byte: 1 start bit, 8 data bit,(odd-even check bit),1 stop bit (with odd-even check bit) or 1 stop bit (without odd-even check bit).

Function code: (see Table 3)
The code indicate which function should be operated by the terminal. Below Table shows the function code and their meaning and function.

Table 3

Code	Meaning	Action
01	Read switching output status	Get switching output status
02	Remote switch capacity input status	Get switching input status
03	Read the value of data register	
04	Read the value of data register	
05	Remotely control single switching output operation	
06	Write single register	Set the binary value to relative one register
0F	Remotely control more than one switching output operation	Get present binary value of one or more register
10H	Write preset register	Set the binary value to relative registers

Checkout code:
Error checkout (CRC) domain take 2 bytes, include one 16 bit binary value.CRC value is calculated by transmission device, then attached to data frame; When receiving device receive data, CRC value will be calculated again, then compare with the received value of CRC domain, if two values are not equal, the error occurs.



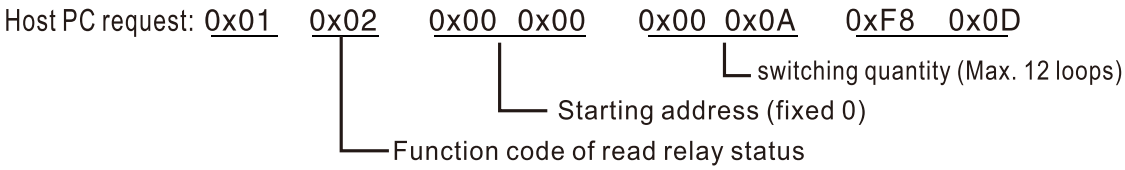
1.3 Input status command of remote-check switch 0 x 02 (see Table 4)

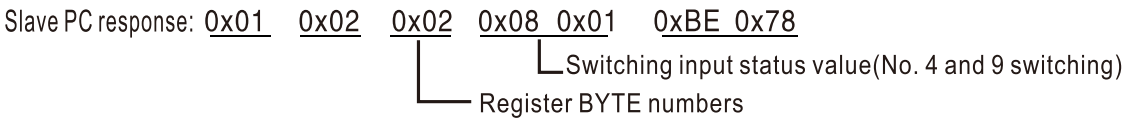
Table 4

Host PC query the command			Slave PC response	
Slave PC address	1 Byte	1 ~247	Slave PC address	1 Byte
Function code	1 Byte	0x02	Function code	1 Byte
Starting switch address	2 Bytes	0x0000(Fixed)	Byte number of register	1 Byte
Remote-check switch quantity	2 Bytes	0x000C(MAX.)	Register value	N Bytes
CRC checkout code	2 Bytes		CRC checkout code	2 Bytes

1.4 Example

Remote-check switching input status (Function code0 x 02)





Description: The switching input status value corresponds to the status value of each switching input starting from the lowest bit of each byte according to the MODBUS protocol. 1 means the ON status and 0 means the OFF status.

The communication protocol of this meter follows the standard MODBUS-RTU protocol. And in the communication address Table, there are both floating-point primary power grid data and secondary power grid fixed-point integers. Customers can choose to read the corresponding data according to their own system requirements. MODBUS protocol communication address information table is shown in Table 17.

Communication message examples:

Read data(function code:03): this function makes the user get the data collected and recorded by terminal device and The system parameter. There is no quantity limit when the host PC collect the data in one time, but can't exceed the range of defined address. The below example is from terminal device addressing 12(0CH), read 3 data Ia, Ib, Ic (each address take 2 byte, the beginning address of Ia is 43 (2BH) , data length is 3(03H)byte.

Query the data frame (Host PC) (See Table 5)

Table 5

Address	Command	The beginning register address (high)	The beginning register address (low)	Register quantity (high)	Register quantity (low)	CRC16 (low)	CRC16 (High)
01H	03H	00H	58H	00H	02H	45H	D8H

Response data frame (slave PC) (see Table 6)
It means Ia=0000C317H(4.9943).

Table 6

Address	Command	Data length	Data 1234	CRC16 (low)	CRC16 (High)
01H	03H	04H	00H 00H C3H 17H	72H	E5H

Preset data (function code: 16): this function allows to change the contents of multiple registers (electrical measurement can be written with this function number, it should be emphasized that the written data is a writable attribute parameter, the number does not exceed the address Range), the following example is a communication method with a current transformation ratio of 400 / 5A = 80.

Query the data frame (Host PC) (See Table 7)

Table 7

Address	Command	The beginning register address (high)	The beginning register address (low)	Register quantity (high)	Register quantity (low)	Number of characters	Written data	CRC16 (low)	CRC16 (High)
01	10	00	2E	00	01	02	0050	A0	22

Query the data frame (Slave PC),indicates that the data has been written (See Table 8)

Table 8

Address	Command	The beginning register address (high)	The beginning register address (low)	Register quantity (high)	Register quantity (low)	CRC16 (low)	CRC16 (High)
01	10	00	2E	00	01	61	C0

MODBUS Address Data Table (see Table 9)

Table 9

Address		Description	Data format	Data length	Read/ write	Explanation
0001						
0002		Corresponding item of output 1	uchar	1	R/W	Corresponding item of switching output
		Level delay of output 1	uchar	1	R/W	Unit: Second
0003		Corresponding value of output 1	uint	2	R/W	Alarm value
0004		Return difference value of output 1	uint	2	R/W	Returned value
0005		Limit alarm of output 1	uint	2	R/W	Min. value of lower alarm
0006-0019		Output 2-6 loops				
001A		Corresponding item of analog output 1	uchar	1	R/W	Corresponding item of analog output
		Corresponding mode of analog output 1	uchar	1	R/W	0,4-20mA 1,0-20mA
001B		Corresponding value of analog output 1	uint	2	R/W	Analog corresponding value
001C-0021		2-4 loops of analog output				
0022-0027		Backup				
0028		Power display setting	uchar	1	R/W	Reserve
		Wiring mode selection	uchar	1	R/W	see the address explanation
0029		Power-on display	uchar	1	R/W	displayed contents
		Back-light delay time	uchar	1	R/W	Back-light delay time
002A		Luminance	uchar	1	R/W	LED Luminance
		CT quantity	uchar	1	R/W	0,3CT 1,2CT
002B		Time setting of scrolling display				
002C		Voltage multiplying power	uint	2	R/W	1-9999
002D		PT divisor	uint	2		1-9999
002E		Current multiplying	uint	2	R/W	1-9999
002F		Backup				
0030		Voltage null	uint	2	R/W	0.001-9.999
0031		Current null	uint	2	R/W	0.001-.500
0032		Power null	uint	2	R/W	0.001-9.999
0033		Communication protocol	uint	2	R/W	0-RS485Modbus
0034		Communication address	uint	2	R/W	0-247
0035		Baud rate	uint	2	R/W	1-6,1:1200,2:2400, 3:4800,4:9600(default), 5:19200,6:38400

0036		checking	uint	2	R/W	0-2,0:even checking, 1:odd checking, 2:no checking(default)
0037		Backup				
0038-003B		645 communication address	uchar	8	R/W	BCD code
003C		Baud rate of No.2 loop	uint	2	R/W	1-6,1:1200,2:2400, 3:4800,4:9600(default), 5:19200,6:38400
003D		No.2 loop checking	uint	2	R/W	0-2,0:even checking, 1:odd checking, 2:no checking(default)
003E-003F		Backup				
0040		Switching output information	uint	2	R	High 8 bit backup, low 8 bit valid 0: OFF 1: ON
0041		Switching input information	uint	2	R	0: OFF 1: ON
0042		A phase voltage	ulong	4	R	4 decimal point (0.0001V)
0043						
0044		B phase voltage	ulong	4	R	4 decimal point (0.0001V)
0045						
0046		C phase voltage	ulong	4	R	4 decimal point (0.0001V)
0047						
0048		Average phase voltage	ulong	4	R	4 decimal point (0.0001V)
0049						
004A		Phase voltage unbalance	ulong	4	R	0.01-99.99 2 decimal point (%)
004B						
004C		AB line voltage	ulong	4	R	4 decimal point (0.0001V)
004D						
004E		BC line voltage	ulong	4	R	4 decimal point (0.0001V)
004F						
0050		CA line voltage	ulong	4	R	4 decimal point (0.0001V)
0051						
0052		Average line voltage	ulong	4	R	4 decimal point (0.0001V)
0053						
0054		Zero-sequence voltage	ulong	4	R	4 decimal point (0.0001V)
0055						

0056		Line voltage unbalance	ulong	4	R	0.01-99.99 2 decimal point (%)
0057						
0058		A phase current	ulong	4	R	4 decimal point (0.0001A)
0059						
005A		B phase current	ulong	4	R	4 decimal point (0.0001A)
005B						
005C		C phase current	ulong	4	R	4 decimal point (0.0001A)
005D						
005E		Average current	ulong	4	R	4 decimal point (0.0001A)
005F						
0060		Zero-sequence current	ulong	4	R	4 decimal point (0.0001A)
0061						
0062		Current unbalance	ulong	4	R	0.01-99.99 2 decimal point (%)
0063						
0064		A phase active power	long	4	R	4 decimal point (0. 0001kW)
0065						
0066		B phase active power	long	4	R	4 decimal point (0. 0001kW)
0067						
0068		C phase active power	long	4	R	4 decimal point (0. 0001kW)
0069						
006A		Total active power	long	4	R	4 decimal point (0. 0001kW)
006B						
006C		A phase reactive power	long	4	R	4 decimal point (0. 0001kvar)
006D						
006E		B phase reactive power	long	4	R	4 decimal point (0. 0001kvar)
006F						
0070		C phase reactive power	long	4	R	4 decimal point (0. 0001kvar)
0071						
0072		Total reactive power	long	4	R	4 decimal point (0. 0001kvar)
0073						
0074		A phase apparent power	long	4	R	4 decimal point (0. 0001kVA)
0075						

0076		B phase apparent power	long	4	R	4 decimal point (0. 0001kVA)
0077						
0078		B phase apparent power	long	4	R	4 decimal point (0. 0001kVA)
0079						
007A		Total apparent power	long	4	R	4 decimal point (0. 0001kVA)
007B						
007C		A phase power factor	int	2	R	3 decimal point
007D		B phase power factor	int	2	R	3 decimal point
007E		C phase power factor	int	2	R	3 decimal point
007F		Total power factor	int	2	R	3 decimal point
0080		Frequency	uint	2	R	Frequency 2 decimal point
0081		Backup				
0082		Total positive active energy	ulong	3	R	Secondary side (0.001kWH)
0083						
0084		Total negative active energy	ulong	3	R	Secondary side (0.001kWH)
0085						
0086		Total positive reactive energy	ulong	3	R	Secondary side (0.001kvarH)
0087						
0088		Total negative reactive energy	ulong	3	R	Secondary side (0.001kvarH)
0089						
008A		Total positive active energy	float		R	Primary side
008B						
008C		Total negative active energy	float		R	Primary side
008D						
008E		Total positive reactive energy	float		R	Primary side
008F						
0090		Total negative reactive energy	float		R	Primary side
0091						