Three phase guide rail type multifunctional intelligent electricity meter V2.2

user 's manual

1、Product introduction

The three-phase multifunctional electric energy meter is a new three-phase electronic electric energy meter newly developed by our company

Energy meter, which adopts microelectronic technology and imported special large-scale integrated circuit, and applies digital acquisition

With advanced technologies such as sample processing technology and SMT process, the performance of the meter fully meets the national standards

GB/T117215. 321-2008 (IEC 62053-21:2003, IDT) and GB / T

Class 1 or 0.55 in 17215.322-2008 (IEC 62053-22:2003, IDT)

According to the relevant technical requirements of electric energy meter, it can directly and accurately measure the AC voltage with rated frequency of 50 / 60Hz

Current active electric energy, total active / reactive electric energy and input / output active / reactive electric energy are displayed by LCD

Energy, three-phase voltage, current, total / phase active power, total / phase power factor, frequency, etc

The utility model has the advantages of good reliability, small volume, light weight, beautiful appearance, flexible and convenient installation, etc

Point.

2、Functions and features

35 mm DIN standard rail mounting in accordance with DIN en-50022

High accuracy measurement of active electric energy, active electric energy level 1 and reactive electric energy level 2

Or active electric energy level 0.5 and reactive electric energy level 2

LCD 6 + 1-bit display (999999.9kwh)

Passive pulse output, conforming to din43864 standard

LED indication pulse output

Quick query of various parameters

One RS485 communication interface, supporting Modbus communication protocol or DL / 645-2007

Communication protocol (optional)

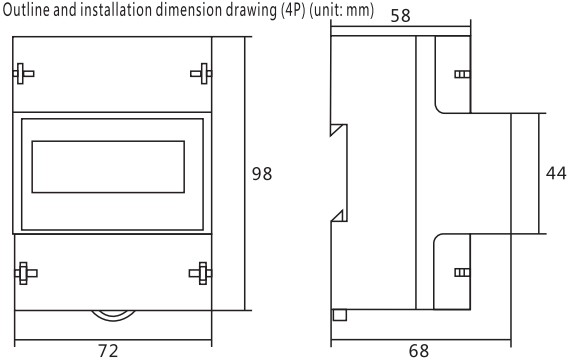
It has the functions of reactive energy measurement and displaying current, voltage and power factors

3、Product specification

function	Basic payment	Clearing money	Multifunctional	Multifunctional (upgraded)
Active power measurement	√	√	√	√
Two way metering	√		√	√
485 communication			√	√
Backlight display	√	√	√	√
Power distribution (can be cleared)		√		
real-time display	Voltage, current and power		Reactive power, voltage Current, power Power factor Mailing address Frequency, constant	In multi-function On the basis of, Change ratio increase Setting and address settingSet.

4、Outline and installation dimensions

Outline and installation dimension drawing (4P) (unit: mm)



5、 Use wiring mode

The meter is divided into direct access type (rated maximum current < 100a) and access type through transformer.

The wiring is shown in the figure below (4P):

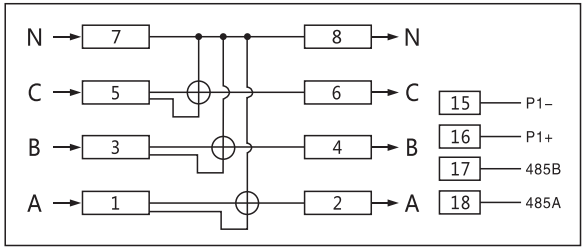


Figure 5-1 direct access

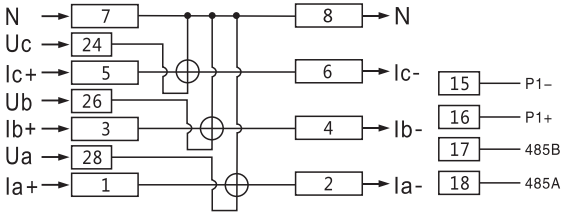
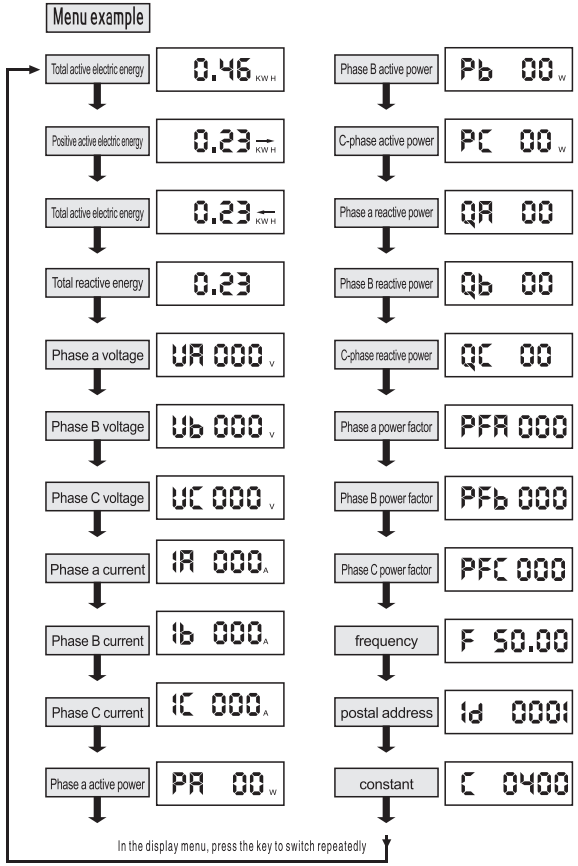


Fig. 5-2 connected through transformer

6、 Display and key operation

6.1 display description

The device panel has indicator lights: voltage indicator, active indicator and reactive indicator. Pulse output indicator light: each time a pulse is output, the light flashes once to synchronously indicate the pulse output.

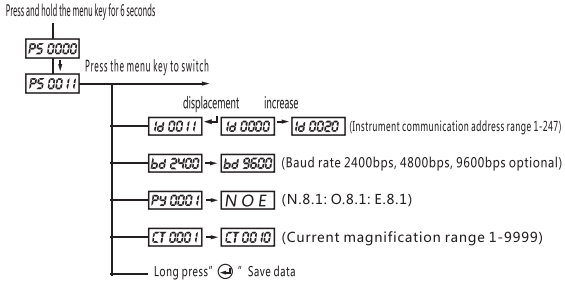


7、Main technical parameters

Rated voltage	3X220/380V 3X57.7/100V 3X380V 3X100V	Accuracy	Level 1 and 0.5s
Rated current	Direct access : 10 (40) A 15 (60) A 20 (80) A 30 (100) A Via transformer : 1.5 (6) A	Overall dimension	96x72x68mm (L x W x H)
Input frequency	50/60Hz	Installation mode	35mm standard guide rail installation
Starting current	0.4%Ib	Working conditions	Operating temperature: - 10 ° C ~ + 55 °C
Working power supply	3X220VAC±20%		Storage temperature: - 40 ° C - + 70 ° C
power waste	<2W/10VAEach phase		Relative humidity: 5% ~ 95%, no condensation

Note 1: please refer to the national standard GB / t17215 for the value of starting current according to the instrument grade 321 relevant provisions in 2008.

8、Programming menu



9、Introduction to Modbus Communication

The meter provides serial asynchronous semi-active RS485 communication interface and adopts Mod-bus-

RTU protocol, all kinds of data information can be transmitted on the communication line. On a 485 bus

Up to 32 instruments can be connected at the same time, and each instrument can set its communication address

(address No.), the communication terminal numbers of different series of instruments may be different

Shielded twisted pair with copper mesh shall be used for communication connection, and the wire diameter shall not be less than 0.5mm2. wiring

The communication line shall be used to keep away from strong electric cables or other strong electric field environment. T-type network is recommended

How to connect. Star or other connection methods are not recommended.

Modbus / RTU communication protocol: Modbus protocol is adopted on one communication line

Communication connection mode of master-slave response mode. First, the signal of the host computer is addressed to a single computer

An address of the terminal device (slave), and then the response signal sent by the terminal device is in the opposite direction

The direction is transmitted to the host, that is, on a separate communication line, the signal goes along the opposite two sides

Transmit all communication data streams to the (half duplex working mode).

Modbus protocol only allows communication between host (PC, PLC, etc.) and terminal equipment

Data exchange between independent terminal devices is not allowed, so that each terminal device will not

When they are initialized, they occupy the communication line and are limited to responding to the query signal arriving at the local machine.

Host query: the query message frame includes device address code, function code, data information code

Check code. The address code indicates the function code of the slave device to be selected and tells the selected slave device

What kind of function to perform, such as function code 03 or 04, requires reading the register from the device and returning it

Return to their contents; The data segment contains other additional information about the functions to be performed by the slave device, such as

In the read command, the additional information of the data segment includes the number of registers from which to read;

The check code is used to check the correctness of a frame of information and provides a verification message for the slave device

Whether the content is the correct method, it adopts the calibration rules of CRC16.

Slave response: if the slave device generates a normal response, there is a slave in the response message

Address code, function code, data information code and CRC16 check code. The data information code includes

Data collected from a device, such as register values or status. If an error occurs, we agree

The slave does not respond.

Transmission mode refers to a series of independent data structures within a data frame and used for transmission

For the limited rules of data, the transmission mode compatible with Modbus protocol RTU mode is defined below

Input mode. Bits of each byte: 1 start bit, 8 data bits, (parity bit)

1 stop bit.

Structure of data frame: message format.

Address code	Function code	Data code	Check code
1 byte	1 byte	N bytes	2 bytes

Byte address code: it is the beginning of the frame and consists of one byte (8-bit binary)

The decimal system is 0 ~ 255, and only 1 ~ 247 is used in our system

It keeps the address. These bits indicate the address of the terminal device specified by the user

Will receive data from the host to which it is connected. The address of each terminal device must be unique

First, only the addressed terminal will respond to the query containing the address

Send back a response. The slave address data in the response tells the host which terminal and

Communicate with them.

Data code: contains the data or terminal response required by the terminal to perform specific functions

The data collected during query should be. The contents of these data may be numerical values and reference addresses

Or set the value. For example, the function field code tells the terminal to read a register and the data field

You need to reflect which register to start from and how many data to read, and the slave data

The content of code return includes data length and corresponding data.

Check code: the error check (CRC) field occupies two bytes, including one

16 bit binary value. The CRC value is calculated by the transmission device and then appended to the data

On the frame, the receiving device recalculates the CRC value when receiving data, and then compares it with the received data

Compare the values in the CRC field. If the two values are not equal, an error occurs.

The process of generating a CRC is:

1) Preset a 16 bit register as ffffh (hexadecimal, all 1), which is called

CRC register.

2) Compare the 8 bits of the first byte in the data frame with the low byte in the CRC register

Perform XOR operation and save the result back to CRC register.

3) Move the CRC register one bit to the right, fill the highest bit with 0, and move the lowest bit out and

testing.

4) If the bit removed in the previous step is 0: repeat the third step (next time)

Shift): 1; Enter the CRC register with a preset fixed value (0a001h)

Row XOR operation.

5) Repeat steps 3 and 4 until 8 shifts. It's done one by one

The whole eight.

6) Repeat steps 2 to 5 to process the next octet until all bytes

End of processing.

7) Finally, the value of CRC register is the value of CRC.

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

Code meaning	significance
0x03/0x04	Register read write value
0x10	Set register instruction

Examples

(1) Read operation of register (data register)

Power reading:

Issued data (hexadecimal): 00 04 00 1D 00 02 E0 1C

Data Description:

data	detailed description
00	Instrument address
04	Function code, read data register
00 1D	Read the data from the 00 1D register address inside the instrument
00 02	Read data length, 1 word (2 bytes)
E0 1C	It refers to the CRC verification of the previous data, in which the low order is in the front and the high order is in the back

Return: 00 04 00 99 58 80 EE

Data Description:

data	detailed description
00	Instrument address
04	Return function code
04	The returned data length is 2 bytes

data	detailed description
00 00 99 58	(converted decimal 39256) the data returned by 392.56kw is 2 bytesInteger data for
80 EE	CRC check returned

《Modbuscommunicationprotocolappendix》

MODBUS-RTU communication address information table (03 04 read 10 as write universal address 00) default baud rate: 9600bps even validity						
address (Hex)	Data content	data format	Data length (word)	Company	Read / write R/ W	explain
0x00	Phase A voltage	Int	1	0.1V	R	Ua (Examples： Addr 04 00 00 00 02 CRC0 CRC1)
0x01	Phase B voltage	Int	1	0.1V	R	Ub
0x02	Phase C voltage	Int	1	0.1V	R	Uc
0x03	Phase A current	Int	1	0.1A	R	Ia
0x04	Phase B current	Int	1	0.1A	R	Ib
0x05	Phase C current	Int	1	0.1A	R	Ic
0x08	Phase A active power	Int	1	W	R	Pa
0x09	Phase B active power	Int	1	W	R	Pb
0x0A	Phase C active power	Int	1	W	R	Pc
0x0C	Phase A reactive power	Int	1	Var	R	Qa
0x0D	Phase B reactive power	Int	1	Var	R	Qb
0x0E	Phase C reactive power	Int	1	Var	R	Qc
0x14	Phase A power factor	Int	1	0~1.000	R	cosQ A
0x15	Phase B power factor	Int	1	0~1.000	R	cosQ B
0x16	Phase C power factor	Int	1	0~1.000	R	cosQ C
0x1A	Voltage frequency	Int	1	0.01Hz	R	FR
Meter setting parameters (read)						
0x61	Instrument communication address	Int	1		R	1–247
0x62	Communication baud rate	Int	1		R	0–600；1–1200； 2–2400；3–4800；4–9600
0x63	Communication data format	Int	1		R	data format 0–N.8.1 1–O.8.1 2–E.8.1
Meter setting parameters (write)						
0x61	Instrument communication address	Int	1		W	1–247
0x62	Communication baud rate	Int	1		W	0–600；1–1200； 2–2400；3–4800；4–9600
0x63	Communication data format	Int	1		W	data format 0–N.8.1 1–O.8.1 2–E.8.1
Current electric energy						
0x001D	Current total active electric energy	long	2	0.01Kwh	R	
0x0027	Current positive total active electric energy	long	2	0.01Kwh	R	
0x0031	Current reverse total active electric energy	long	2	0.01Kwh	R	
0x003B	Current total reactive energy	long	2	0.01Kvarh	R	
0x0045	Current positive total reactive energy	long	2	0.01Kvarh	R	
0x004F	Current reverse total reactive energy	long	2	0.01Kvarh	R	