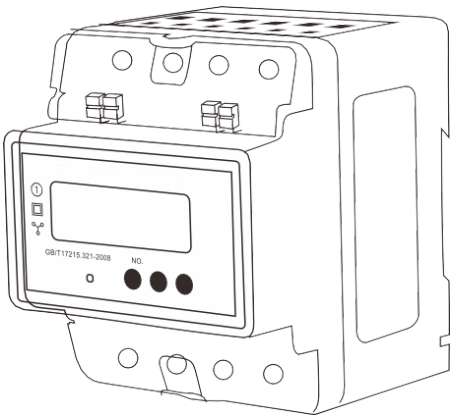
Three phase multifunctional power meter (rail type)

Installation and Use Manual

Ver 2.1



1、Summary

The rail type multifunctional power meter is a new generation of miniature rail type energy meters developed by our company based on years of experience in meter design. The instrument adopts LCD display and has the function of outputting electric energy pulses; RS485 communication interface can be used to exchange data with the upper computer, greatly facilitating the automation management of electricity consumption. This instrument has the advantages of small size, high accuracy, good reliability, and easy installation. Its performance indicators meet the technical requirements of international GB/T17215, GB/T17883, and DL/T614 for instruments in the power industry.

2、 Main functions

name	explain	to configure
parameter measurement	U、I、P、Q、F etc.	Standard configuration
Electricity metering	Three phase energy metering	
display	7-digit segment code LCD paging wheel display	
signal communication	RS485 interface Modbus RTU, DLT645-2007 protocol	Optional selection

3、Technical parameters

project	Technical indicators
Electric energy accuracy level	Level 1.0
Range of electric energy metering	0~999999.9KWh
Rated voltage	AC 3x 220/380V
Current specifications	1.5(6)A、5(20)A、10(40)A、15(60)A、20(80)A
working voltage	Normal: 0.9~1.1Un Limit: 0.7~1.2Un
Reference frequency	45~65Hz
Starting current	0.004Ib
Power consumption	≤5VA
Pulse output	Pulse width: 80 ± 20ms optocoupler isolated output
Digital Communication	RS485 interface, Modbus RTU DLT645-2007 protocol
temperature range	-10℃~+55℃
relative humidity	≤95% No condensation
External dimensions	76×89×76

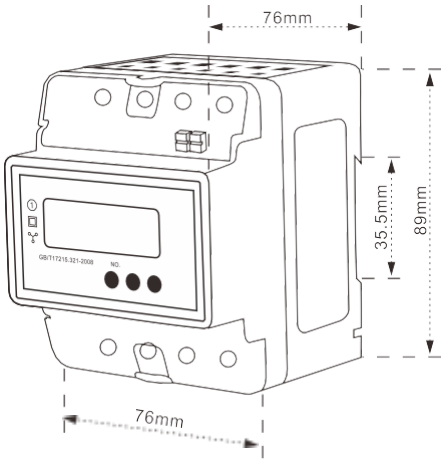
4、Product specifications

Product series	Accuracy level	Rated voltage	Current specifications	Pulse constant
Rail type three-phase multifunctional electric energy meter	1.0	AC 3×220V *380V The electricity meter does not currently support customization	External current transformer type 1.5(6)A	3200imp/kwh
			5(20A)	1600imp/kwh
			10(40)A	
			15(60)A	
			20(80)A	

*When the input current is greater than 80A, an external/5A current transformer is required

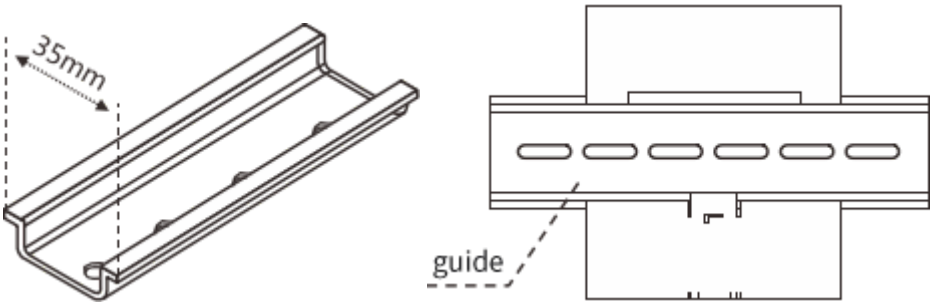
5、installation and wiring

1.Exterior installation

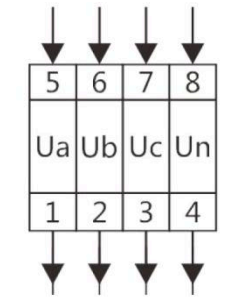


2. Installation diagram

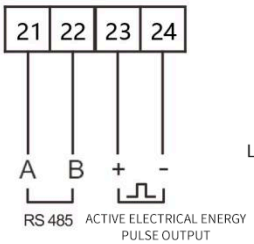
Adopting 35mm standard guide rail installation method, as shown in the following figure：

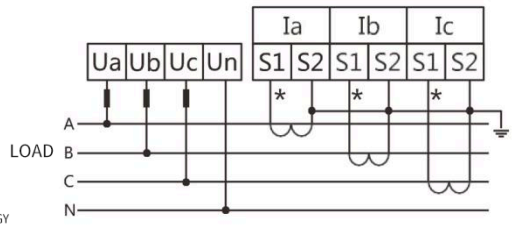


3. Wiring diagram



THREE PHASE FOUR WIRE
DIRECT CONNECTION





THREE PHASE FOUR WIRE INPUT VIA CT

Attention:

1. When wiring, be sure to tighten the screws to avoid abnormal operation of the instrument due to poor

contact.

2. When the input current is greater than 80A, an external/5A current transformer is required.

6、Interface display

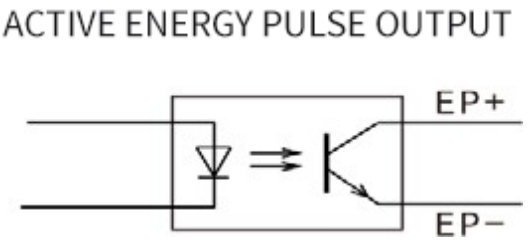
In normal display mode, press the button to flip through the pages for display



Page number	display information	Page number	display information
1	Total electricity consumption	9	A-phase current
2	Total active power	10	B-phase current
3	A-phase active power	11	C-phase current
4	B-phase active power	12	Power factor
5	C-phase active power	13	frequency
6	A-phase voltage	14	Bureau number low
7	B-phase voltage	15	Bureau number high position
8	C-phase voltage	16	the Meter address

7、Electric pulse output

The electric energy meter provides one channel of electric energy pulse output function. The power pulse of the optocoupler relay with open collector can achieve remote transmission of active power, and the total number of pulses collected by the instrument can be measured by remote computer terminals, PLCs, and DI switch acquisition modules to achieve cumulative power measurement. The output method used is the accuracy verification of electrical energy (National Metrology Regulations: Pulse Error Comparison Method for Standard Meters)



E

lectric pulse output diagram

1. Electrical characteristics: The circuit schematic is shown in the above figure, and the external power supply should be within the range of DC+5V to DC+48V.

2. Pulse constant: Its meaning is the number of output pulses when the energy meter accumulates 1kWh.

3. Application example: The PLC terminal uses a pulse counting device. Assuming that N pulses are collected during a period of time with a length of t, the accumulated electrical energy of the instrument during this period is N/pulse constant (kWh). Produce a picture

8、Communication Protocol

Host request	Frame structure	Address code	Function code	Data code				Verification code
				Starting register address	Number of registers	Number of data bytes	Write data	
	Occupied bytes	1 byte	1 byte	2 byte	2byte	1 byte	Nbyte	2byte
	Data Range	1~247	0X10		maximum25	maximum2*25		CRC
	Example of message	0X01	0X10	0X02 0X18	0X00 0X02	0X04	0X10 0X64 0X00 0X0A	0X2B 0XBD
	Occupied bytes	Address code	Function code	Data code				Verification code
				Starting register address		Number of registers		
	Data Range	1 byte	1 byte	2 byte		2 byte		2 byte
	Example of message	0X01	0X10	0X02 0X18		0X00 0X02		0X60 0X78

Explanation: To ensure normal communication, the number of registers is limited to 25 for each host request. In the example above, the starting register address "0x02 0x18" represents the first address for setting the voltage ratio, and the number of registers "0x00 0x02" represents setting the voltage ratio and current ratio for a total of 2 WORD data. The write number "0x00 0x64 0x00 0x0A" represents setting the voltage ratio to 100 and the current ratio to 10. Please refer to the MODBUS-RTU communication address information table.

Note: Perform permission verification before writing the set register instruction;

Host request	address	Function code	Starting address	Number of registers	Number of bytes in the data domain	Data domain	CRC verification code
	0X01	0X10	0X02 0X00	0X00 0X01	0X02	0X00 0X0b	0XC4 0X57
Slave response	address		Function code	Starting address	Data domain		CRC verification code
	0X01		0X10	0X02 0X00	0X00 0X01		0X81 0XB9
After receiving the correct response, there is a set time of 20 minutes, after which permission verification must be re performed							

MODBUS-RTUMailing Address Information Table					
Address HEX	data format	Company	Read/Write	Data lengthword	explain
0X00~0X09		retain			
One power grid data（float）					
0X0A	Float	V	R	2	Primary A-Phase voltage
0X0C	Float	V	R	2	Primary B-Phase voltage
0X0E	Float	V	R	2	Primary C-phase voltage
0X10	Float	V	R	2	Primary AB-line voltage
0X12	Float	V	R	2	Primary BC- line voltage
0X14	Float	V	R	2	Primary CA- line voltage
0X16	Float	A	R	2	Primary A-Phase current
0X18	Float	A	R	2	Primary B-Phase current
0X1A	Float	A	R	2	Primary C-phase current
0X1C	Float	KW	R	2	Primary A-phase Active power
0X1E	Float	KW	R	2	Primary B-phase Active power
0X20	Float	KW	R	2	Primary C-phase Active power
0X22	Float	KW	R	2	Primary total active power
0X2C	Float	KVA	R	2	Primary Total apparent power
0X2E	Float	1	R	2	Primary Total power factor
0X30	Float	HZ	R	2	frequency
0X32	Float	kWh	R	2	Positive active energy
0X34	Float	kWh	R	2	Reverse active energy

0X3A	Float	1	R	2	Primary A-phase power factor
0X3C	Float	1	R	2	Primary B-phase power factor
0X3E	Float	1	R	2	Primary C-phase power factor
0X40	Float	KVA	R	2	Primary A-phase apparent power
0X42	Float	KVA	R	2	Primary B-phase apparent power
0X44	Float	KVA	R	2	Primary C-phase apparent power
Secondary power grid data（Int/long）					
0X46	Int	0.1V	R	1	A-phase voltage
0X47	Int	0.1V	R	1	B-phase voltage
0X48	Int	0.1V	R	1	C-phase voltage
0X4A	Int	0.1V	R	1	BC line voltage
0X4B	Int	0.1V	R	1	CA line voltage
0X4C	Int	Direct access 0.01A External configuration 0.001A	R	1	A-phase current
0X4D	Int	Direct access 0.01A External configuration 0.001A	R	1	B-phase current
0X4E	Int	Direct access 0.01A External configuration 0.001A	R	1	C-phase current
0X4F	Int	Direct access 0.01KW External configuration 0.001KW	R	1	A-phase active power
0X50	Int	Direct access 0.01KW External configuration 0.001KW	R	1	B-phase active power
0X51	Int	Direct access 0.01KW External configuration 0.001KW	R	1	C-phase active power
0X52	Int	Direct access	R	1	Total active power

		0.01KW External configuration 0.001KW			
0X57	Int	Direct access 0.01KVA External configuration 0.001KVA	R	1	A-phase apparent power
0X58	Int	Direct access 0.01KVA External configuration 0.001KVA	R	1	B-phase apparent power
0X59	Int	Direct access 0.01KVA External configuration 0.001KVA	R	1	C-phase apparent power
0X5A	Int	Direct access 0.01KVA External configuration 0.001KVA	R	1	Total apparent power
0X5B	Int	0.01	R	1	A-phase power factor
0X5C	Int	0.01	R	1	B-phase power factor
0X5D	Int	0.01	R	1	C-phase power factor
0X5E	Int	0.01	R	1	Total power factor
0X5F	Int	0.01hz	R	1	frequency
0X63	long	0.01kWh	R	2	Total active electrical energy
0X65	long	0.01kWh	R	2	Positive active energy
0X67	long	0.01kWh	R	2	Reverse active energy
Meter parameters					
0X0200	Int		W		Programming password setting（1-500）
0X0210	Int		R/W		Instrument communication address（1-247）
0X0211	Int		R/W		Baud rate 0-1200 1-2400 2-4800 3-9600
0X0212	Int		R/W		data format 0-N.8.1 1-0.8.1 2-E.8.1Working mode
0X0213	Int		R/W		0-Three phase four wire 1-Three

					phase three wire
0X0214	Int		R		Voltage range0-100V;1-220V;2-380V
0X0215	Int		R		current range 0-1.5(6); 1-5(20); 2-10(40); 3-20(80)
0X0216	Int		R		Electric meter constant
0X0218	Int		R		PT -voltage ratio
0X0219	Int		R/W		CT -current ratio

9、DL/T645-2007 Communication Protocol

The electric energy meter provides a serial asynchronous half work RS485 communication interface, using the DLT645-2007 protocol, and various data information can be transmitted on the communication line. Up to 32 devices can be connected simultaneously on a 485 bus, and the communication address of the energy meter is a 12 digit number with the same meter number, which cannot be changed after leaving the factory. The communication connection should use shielded twisted pair cables with copper mesh, with a wire diameter of not less than 0.5 square millimeters. When wiring, communication lines should be kept away from strong electrical cables or other strong electric field environments, and it is recommended to use a hand in hand connection method. Following the standard DLT645-2007 communication protocol, please refer to the relevant standards for details, which will not be elaborated here

Data identification	function	format	byte	visit	explain
00000000	Total active power consumption	BCD	4	read-only	XXXXXX.XX
00010000	Positive active total electrical energy	BCD	4	read-only	XXXXXX.XX
00020000	Total reactive energy	BCD	4	read-only	XXXXXX.XX
02010100	A-phase voltage	BCD	2	read-only	XXX.X
02010200	B-phase voltage	BCD	2	read-only	XXX.X
02010300	C-phase voltage	BCD	2	read-only	XXX.X
0201FF00	Voltage data	BCD		read-only	

	block				
02020100	A-phase current	BCD	3	read-only	XXX.XXX
02020200	B-phase current	BCD	3	read-only	XXX.XXX
02020300	C-phase current	BCD	3	read-only	XXX.XXX
0202FF00	Current data block	BCD		read-only	
	Three phase total current				XXX.XXX
02030100	A-phase power	BCD	3	read-only	XXX.XXX
02030200	B-phase power	BCD	3	read-only	XXX.XXX
02030300	C-phase power	BCD	3	read-only	XXX.XXX
0203FF00	Instantaneous active power block				
02030000	Total active power	BCD	3	read-only	XXX.XXX
02800002	Frequency	BCD	2	read-only	XX.XX
	Positive active power				XX.XXXX
	Reverse active power				XX.XXXX
02060100	A-phase power factor	BCD	2	read-only	X.XXX
02060200	B-phase power factor	BCD	2	read-only	X.XXX
02060300	C-phase power factor	BCD	2	read-only	X.XXX
0206FF00	Power factor data block	BCD		read-only	
02060000	Total power factor	BCD	2	read-only	X.XXX
04000401	postal address	BCD	6	Read/Write	NNNNNNNNNNNN
04000703	Baud rate	BCD	1	Read/Write	NN: 1200 Code: 04 2400

					Code: 08 4800 Code: 10 9600 Code: 20

10、Transportation and storage

1. The transportation and storage of electric energy meters should not be subjected to severe impacts, and should be carried out in accordance with the provisions of GB/T15464-1995 "General Technical Conditions for Packaging of Instruments and Meters".

2. Keep the energy meter in its original packaging in an environment where the temperature does not exceed -25 ℃ to 70 ℃, the relative humidity does not exceed 85%, and there should be no corrosive gases in the air.

3. Electric energy meters should be stored on shelves in the warehouse, with a stacking height of no more than 5 boxes. After unpacking, the stacking height of a single packaged electric energy meter should not exceed 10 pieces.

11、Warranty period and after-sales service

Within 24 months from the date of manufacture of the electric energy meter, if the user complies with the transportation, storage, and use specifications specified in the manual and finds that the meter does not meet the requirements specified in the product standard, our company will provide free repair .

12、Ordering Instructions

When signing the contract, please specify the product model and input signal information in detail. This series of products comes with a default factory setting as standard. If customers have special needs, please specify them in detail in the remarks section.

The following is an example of ordering:

Example 1: Name: Multi functional power meter (rail type)

model:

Input: AC3X220/380V, 10 (40) A