AX9L Series 3 Phase Intelligent Energy Meter User Manual

This series meters are widely applied to control system, SCADA system and energy management system, transformer substation automation, distributing net automation, residence community electrical power monitor, industrial automation, intelligent construction, intelligent switchboard, switch cabinet, etc. It is easy to install and maintain, simple connection, programmable setting parameters on meters or computer.

Features:

- ⊙Measure Items: 3 phase Voltage/Current/Active Power/Reactive Power/Frequency /Power Factor etc, totally 28 parameters
- ⊙Two switch input and two switch output (4 switch input can be ordered)
- ⊙True effective value measurement
- ⊙With RS485 interface，Modbus RTU communication protocol
- ⊙With forward and backward kwh record function. It can record the import and export kwh separatedly

⚠ Warning

An accident may happen and product may be damaged if operation does not comply with the instruction.

National High-tech Enterprise   National Standard Draft Unit

KKDS9L-C01ET02-A/0-20220719

I. Model Illustration

AX9L-□-□□ 3 □

- Communication: 0: Without this function   8: With 1loop RS485 communication
- Input Signal: 3:3phase power network (3phase 3wwire / 3phase 4wire)
- Alarm: C: Two alarm
- Alarm output: A: Without alarm output   R: Relay alarm output
- Measure item: W:voltage,current,power,frequency and power factor measure A:Current measure   V:voltage measure
- Display: L:LCD display
- Dimension: 9:96H×96W   7:72H×72W
- Model: AX series 3phase intelligent power meter

II. Model Example

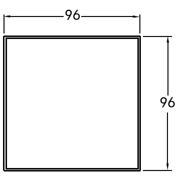
Model	Alarm(DO)	Alarm(DI)	Communication	Measure items	Input
AX9L-W-RC38	2 DO	2 DI	RS485	Voltage,current, power,frequency, power factor	10～480V（L-L）0.02～6A
AX9L-W-A30	No	No	No		
AX9L-A-RC38	2 DO	2 DI	RS485	Current	0.02～6A
AX9L-A-A30	No	No	No		
AX9L-V-RC38	2 DO	2 DI	RS485	Voltage	10～480V（L-L）
AX9L-V-A30	No	No	No		

III. Main Technical Parameters

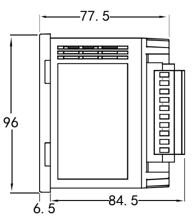
Connection	3 Phase 3 Wires, 3 Phase 4 Wires
Voltage range	AC 10-480V(L-L)
Voltage overload	Continuous: 1.2 times Instantaneous: 2 times/10S
Voltage consumption	<1VA (each phase)
Voltage impedance	≥300KΩ
Voltage accuracy	RMS measurement, accuracy class 0.5
Current range	AC 0.025~5A
Current overload	Continuous: 1.2 times Instantaneous: 2 times/2S
Current consumption	<0.4VA (each phase)
Current impedance	<20mΩ
Current accuracy	RMS measurement, accuracy class 0.5
Freqency	45~60Hz, accuracy 0.01Hz

Power	Active / Reactive / Apparent power, accuracy 0.5 class
Energy	Active Energy 1 class, Reactive Energy 2 class Note: Kwh counting adopt 6 Integer + 2 decimal , when counting to 999999.99, it turns to 7 integer + 1 decimal counting mode . And when counting to 9999999.9, it count from 0 again. Totally counting kwh can be 10, 000,000 kilowatt.
Display	LCD big screen display
Power supply	AC/DC 100~240V (85～265V)
Power supply consumption	≤5VA
Output digital interface	RS-485, MODBUS-RTU Protocol
Switch Input	2 switch input (Dry contact mode)
Alarm output	2 switch output, 250VAC/3A or 30VDC/5A
Work environment	Temperature: -10~50℃, Humidity:<85% RH; Non-corrosive Gas; altitude ≤2500m
Storage environment	-40~70℃
withstand voltage	Power supply , 485 interface , DI interface ≥DC 2000V
insulation	input, output, power supply VS meter cover＞ 5MΩ
Dimension	96H×96W×61.5L (mm)
Weight	0.5kg

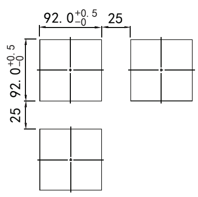
IV.Dimension and Mounting Size (unit:mm)



Panel Size

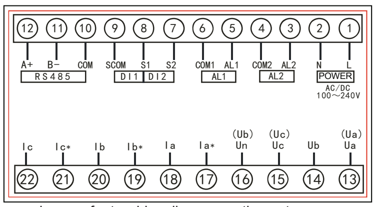


Side-face Size



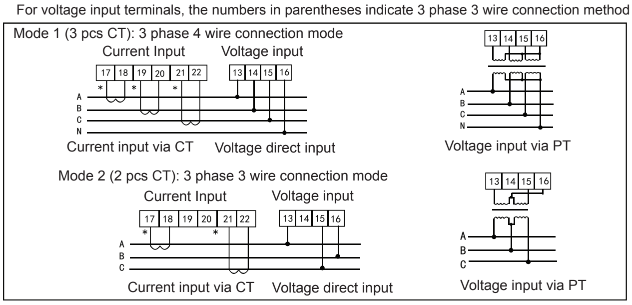
Open hole size

V. Wire connection



please refer to wiring diagram on the meter case

For voltage input terminals, the numbers in parentheses indicate 3 phase 3 wire connection method



Explanation:

A. Voltage input：Input voltage should not be higher than the rated input voltage of meter，otherwise a PT should be used.

B. Current input：Standard rated input current is 5A. A CT should be used when the input current is bigger than 5A. If some other meters are connected with the same CT, the connection should be serial for all meters.

C. Please make sure that the input voltage is corresponding to the input current, they should have the same phase sequence and direction，otherwise the error may occur (power and energy).

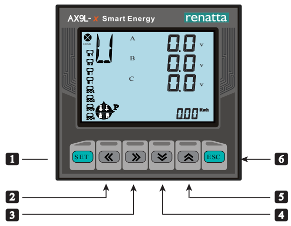
D.The connection mode of meter which is connected to power network should depend on CT quantity. For 2pcs of CT，it should be3 phase 3 wire connection. For 3 pcs of CT，it should be 3 phase 4 wire connection.The input network menu setting should accord to the connection mode of the measured load. Otherwise, the measured voltage or power is incorrect.

E. Please pay attention to the difference between 3 phase 3 wire and 3 phase 4 wire connection. Wrong connection may lead to incorrect calculation of power factor, power and energy.

Caution:

1.Power supply connection must be correct.
2.Pay attention on the phase sequence of voltage signal input.
3.Current signal input should be connected as per the connection drawing.
4.Connection mode should accord to the setting of user menu “LIN”.
5.Energy pulse output is open collector output.
6. Isolation between power supply and circuid board, in case of leakage switch wrong action

IV.Panel Indication



Item	Symbol	Name	Function
1	SET	Set Key	▵ Press this key for 5s to enter menu. ▵ Confirm modified menu value
2	«	Left Key	▵ Shift menu and move data postion in menu operation ▵ To shift measure interface outside of the menu
3	»	Right Key	▵ Shift menu and move data postion in menu operation ▵ To shift measure interface outside of the menu
4	︾	Decrease Key	▵ Enter data modification in menu operation ▵ To shift energy page outside of the menu
5	︽	Increase Key	▵ Enter data modification in menu operation ▵ To shift energy page outside of the menu
6	ESC	Return Key	▵ For backspace in menu operation ▵ Back to previous menu

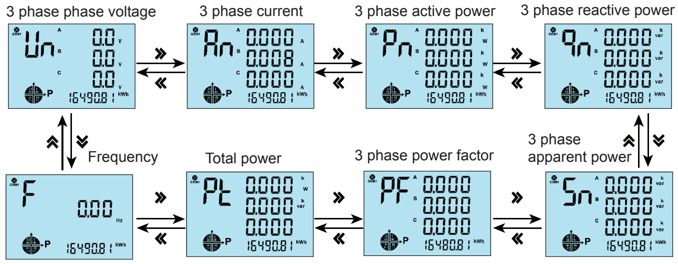
Measure and display interface illustration:

1. Under Measure Status, Press " « / » " key to switch display 3 phase phase voltage, line voltage, current, active power, reactive power, power factor, total power, frequency, etc.
2. Press " ︽ / ︾ " key to switch display total Kwh , forward Kwh, backward Kwh, total Kvarh , forward Kvarh, backward Kvarh.
3. DO1, DO2: In Alarm Mode: used as alarm output status indication. Under switch remote control mode, indicate switch output status .
4. S1, S2, S3, S4 as switch remote control input status indicate; 2 switch input as default
5. COM flashing means communicate is acting.
6. P(Kwh) means Total Active Energy (algebraic sum of forward active energy and backward active energy); Q(Kvarh) means Total Reactive Energy (algebraic sum of forward reactive energy and backward reactive energy).

Note:Representation method of 26 English letters

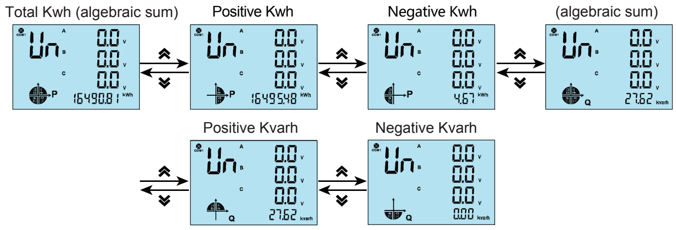
English letter	A	B	C	D	E	F	G	H	I	J	K	L	M
Display	A	b	C	d	E	F	G	H	I	J	K	L	M
English letter	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Display	n	o	P	q	r	S	t	U	V	W	X	Y	Z

Meaurement Interface Switch Display Process



(note: in 3 phase 3 wire status only dislay 3 phase line voltage, current, total active power, reactive power, total power factor, frequency)

Power Interface switch process display



VII. Menu Modification Instruction

Under measurement interface status :

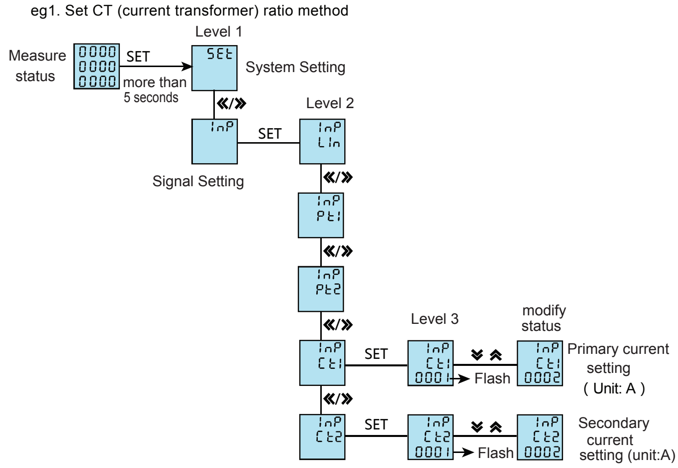
1. Press SET Key more than 5 seconds, if setting password, it will pop up a dialog box, input the correct password to enter into user menu, to modify parameter.
2. If the present display is 1st level, press SET Key enter into next level display, press " « " " » " key to change menu subitems.
3. If the present display is 2nd or 3rd level, press ESC Key, return to previous display.
4. If present display is 3rd level, press " ︾ ", " ︽ " to flash the digit, press " « ", " » " to move position , press " ︾ ", " ︽ " Key to modify value; press SET Key to save setting value when flashing; if press ESC Key, set value will not be saved and return to the 2nd level display.
5. After modifying the parameters, press SET Key more than 5 seconds or press ESC Key to exit user menu and enter into measuring status.

Menu Structure and Function Description

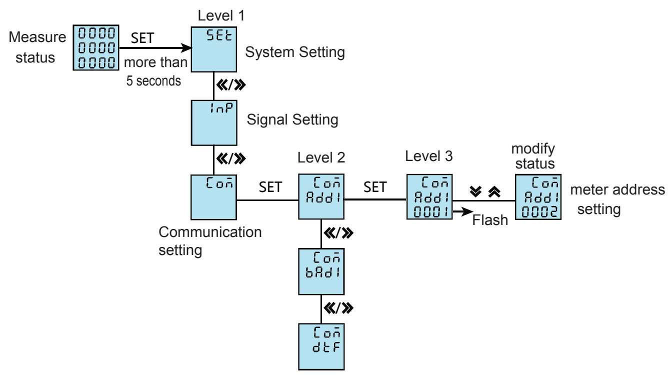
1st level	2nd level		3rd level	Description
SEt System setting	Clear Energy	CLrE	0000	When input 1111, user can clear energy ; When input 1234, reset menu to default setting .
	User Password	USEr	0000	modify password, factory default setting 0000, no password .
	Backlight time	bLt	0000	backlight lighting delay time, unit "second". \When value is "0" , it keeps on lighting.
	primary secondary select	PtCt	SECd/Pr i	SECD means display secondary energy. PRI means display primary energy.
	Page turing time	PGCH	0000	measurent interface shift time, unit second. Set as 0 , no page shift.
	Software version	VEr	1.1	Software version, read only
Signal setting InP	Link	Lin	3-3 / 3-4	Set power net input mode, 3 phase 3 wire or 3 phase 4 wire
	Voltage transform	Pt1	0.1-999.9	Primary voltage, unit KV
	Voltage transform	Pt2	10.0-999.9	Secondary voltage, unit KV
	Current transform	Ct1	1-9999	Primary current, unit A
	Current transform	Ct2	1.0-999.9	Secondary current, unit A
communication setting Con	Address	Add	1-247	Meter address range
	Baud rate	brd	4K8/9K6/19K2	Baud rate. 4K8 means 4800, 9K6 means 9600, 19K2 means 19200
	Data sequence	dtF	H-L / L-H	high register is in front or low register is in front
	Parity bit	PrtY	no/EVEn/odd	No parity / even parity / odd parity
Alarm setting AL	Alarm mode	Ad1	1-58	When value is DO, it is remote control mode, otherwise it is alarm mode, please refer to alarm output parameters table.
	Alarm value unit	Ut1	1/K/M	1: means international standard unit, K: 1000 times of international standard unit, M: 1000000 times of international standard unit
	Alarm value	AL1	0-999.9	1st alarm value setting (unit:standard unit)
	Hysteresis	HY1	0-999.9	1st alarm hysteresis value setting
	Alarm relay select	oUt1	rLY1/rLY2	1st alarm relay output select(when alarm mode is not DO)
	Alarm delay	dLA1	0-99.9	Alarm action delay time, unit: second
	Alarm reset time	dLb1	0-99.9	Alarm action reset time, unit: second
	second alarm setting refer to first alarm parameters setting			

Note: Menus modification example

eg1. Set CT (current transformer) ratio method



eg2. Set communication address



Reference table : Reference table for alarm output electric parameters

1. DO1 , DO2 function can be used for remote control electric equipments. When using this function, set the alarm mode as 0(DO), otherwise DO1, DO2 used as AL1, AL2 output. DO1, DO2 function control can set set by RS485.
2. After the meter power on and running for 5seconds , alarm function begin to work normally.

Reference table for alarm output electric parameters

No.	Item	Switch output low alarm code	Switch output high alarm code
1	Ua(A phase voltage)	1 UaL (UabL)	2 UaH (UabH)
2	Ub(B phase voltage)	3 UbL (UcaL)	4 UbH (UcaH)
3	Uc(C phase voltage)	5 UcL (UbcL)	6 UcH (UbcH)
4	U(A/ B/ C any phase voltage)	7 UL (ULL)	8 UH (ULH)
5	Ia(A line current)	9 IaL	10 IaH
6	Ib(B line current)	11 IbL	12 IbH
7	Ic(C line current)	13 IcL	14 IcH
8	I(A/ B/ C any line current)	15 IL	16 IH
9	P(total active power)	17 PL	18 PH
10	Pa(A phase active power)	19 PaL	20 PaH
11	Pb(B phase active power)	21 PbL	22 PbH
12	Pc(C phase active power)	23 PcL	24 PcH
13	Q(total reactive power)	25 QL	26 QH
14	Qa(A phase reactive power)	27 QaL	28 QaH
15	Qb(B phase reactive power)	29 QbL	30 QbH
16	Qc(C phase reactive power)	31 QcL	32 QcH
17	S(total apparent power)	33 SL	34 SH
18	Sa(A phase apparent power)	35 SaL	36 SaH
19	Sb(B phase apparent power)	37 SbL	38 SbH
20	Sc(C phase apparent power)	39 ScL	40 ScH
21	PF (Total power factor)	41 PFLL	42 PFLH
22	PFa(A phase power factor)	43 PFaL	44 PFaH
23	PFb(B phase power factor)	45 PFbL	46 PFbH
24	PFc(C phase power factor)	47 PFcL	48 PFcH
25	F frequency	49 FL	50 FH
26	EP (Total active energy)	51 (EPL)	52 (EPH)
27	EQ (Total reactive energy)	53 (EQL)	54 (EQH)
28	Unbalanced difference	55 (UNNB)	56 (ULNB)
29	Unbalanced difference	57 (INNB)	58 (PNNB)

Note: The parameters in parentheses are 3 phase 3 wire corresponding alarm parameters . And each single phase power parameters are not alarmed.

VIII. Modbus communication protocol&Modbus-RTU protocol introduction

1. The meter adpots Modbus RTU communication protocol,RS485 half duplex communication, adpots 16 digit CRC check,the meter does not return for error check.

1.1 All the RS485 communication should comply with host/slave method. Under this method, information and data transmit between one host and maximum 32 slaves (monitoring equipment);

1.2 Host will initialize and control all information transmitted in RS485 communication loop.

1.3 In any case, communication can never be started from a slave.

1.4 All the RS485 communication is sending by packet . One data packet is a communication frame. One packet include 128 byte at most.

1.5 Host sending is named request, slave sending is named response.

1.6 In any case, slave can only respond to one request of host.

2. Data frame format:

Start bit	Data bit	Parity bit	Stop bit
1	8	Even Parity/odd Parity/no Parity (can be set)	1

3. Data frame format:

frame	byte	Illustration	
Slave address	1	Valid slave address range is 1-247	
Function code	1	0X03	Read one or more register values
		0X06	Write the specified value to an internal register
		0X10	Write specified value to multiple internal registers
Data address	2	data area storage location when slave executes effective order. Different variable seizes differents numbers of register, some address variable seizes two register, 4 byte data, some variable seizes one register, 2 byte data, please use according to actual situation.	
Data length	2	Data length to be read or written	
Data	variable	The slave returns the response data or the master writing data	
CRC check code	2	MODBUS-RTU mode adopts 16 bit CRC check. Sending equipment should do CRC16 calculation for each data of packet, final result is stored in check area. Receiving equipment also make CRC16 calculation for each data of packet (except check area), and compare result area with check area; only the same packet can be accepted.	

4. Abnormal communication processing

If host send a illegal data packet or host request a invalid data register, abnormal data response will happen. This abnormal data response is consisted of slave address, function code, error code and check area. When the high bit position of function code area is 1, it means the present data frame is abnormal response.

According to MODBUS communication requirement, abnormal response function code=request function code+0x80; when abnormal response, put 1 on the highest bit of function code.

For example: if host request function code is 0x04, slave response function code is 0x84.

Below table illustrates the meaning of abnormal function code:

Error code	Name	Illustration
0X01	Function code error	Meter received the unsupported function code
0X02	Variable address error	Data location designated by host exceeds range of meter, or receive illegal register operation.
0X03	Variable value error	Data value sent from host exceeds the corresponding data range of meter, or data structure is incomplete
0X04	Frame length error	Function code and communication frame length are inconsistent

5. Communication frame delay

There should be an appropriate delay between the two frame requests of the master station for the slave station to respond to the processing. When baud rate set as 9600, the recommended delay time between two host request is 300ms to ensure correct answer. If lower baud rate, more delay time.

IV. Communication frame format illustration

1. Function code "03", read multi-channel register input

For example, host reads UA (A phase voltage), suppose measured A phase voltage is 220.0V. Address code of UA is 0x4000, because UA is fixed data (4 byte), seizes 2 data register, the hexadecimal data of 220.0V is 0x0000898 (2200).

Message format sent by the host: (default high bit in front)

Host sending	bytes	send information	Note
slave address	1	01	Send to slave with address 01
function code	1	03	Read register
start address	2	0x4000	start address
data length	2	0x0002	Read 2 registers (4 bytes in total)
CRC code	2	0XD1CB	CRC code calculated by the host

Message format returned by the slave response:

Slave response	bytes	return information	Note
slave address	1	01	from slave with address 01
function code	1	03	Read register
read word	1	04	2 registers (4 bytes)
register data	1	0x00	High high bit of address 0x4000 memory content
	1	0x00	High bit of address 0x4000 memory content
	1	0x08	low bit of address 0x4000 memory content
	1	0x98	low low bit of address 0x4000 memory content
CRC code	2	0xFC59	CRC code calculated by the slave

2. Function code "06": write single register

For example: Host writes fixed data, 1st alarm mode is AD1.
Suppose the address code of AD1 is 0x4900, because AD1 is fixed data, seizes 1 data register, decimalist code of 11 is 0X000B.

Message format sent by the host:

Host sending	bytes	send information	Note
slave address	1	01	Send to slave with address 01
function code	1	06	Write single register
start address	1	0x49	Register address high byte to write
	1	0x00	Low byte of register address to be written
Data to be written	1	0x00	Data high byte
	1	0x0B	Data low byte
CRC code	2	0xDE51	CRC code calculated by the host

Message format returned by the slave response correctly:

Host sending	bytes	send information	Note
slave address	1	01	Send to slave with address 01
function code	1	06	Write single register
start address	1	0x49	Register address high byte to write
	1	0x00	Low byte of register address to be written
Data to be written	1	0x00	Data high byte
	1	0x0B	Data low byte
CRC code	2	0xDE51	CRC code calculated by the host

3. Function code "10": write multiple registers

For example: Host writes fixed data, 1st alarm mode is AD1. Suppose the address code of AD1 is 0x4900, because AD1 is fixed data, seizes 1 data register, decimalist code of 11 is 0X000B.

Message format sent by the host:

Host sending	bytes	send information	Note
slave address	1	01	Send to slave with address 01
function code	1	10	Write multiple registers
start address	1	0x49	High byte of register start address of to be written
	1	0x00	low byte of register start address of to be written
Data word length to be written	1	0x00	High byte of word length of written data
	1	0x01	low byte of word length of written data
data length to be written	1	0x02	Data byte length (1 byte total)
Data to be written	1	0x00	Data high byte
	1	0x0B	Data low byte
CRC code	2	0x3F53	CRC code calculated by the host

Message format returned by the slave response correctly:

Slave response	bytes	send information	Note
slave address	1	01	from slave with address 01
function code	1	10	Write multiple registers
start address	2	0x4900	start address is 0000
Save data word length	2	0x0002	Save 2 words length data
CRC code	2	0X1795	CRC code calculated by the slave

4. The process of generating a CRC: (Can refer to program example as below)

4.1 Preset a 16 bit register as 0FFFFH(All 1), call it CRC register.

4.2 XOR the first 8-bit binary data (the first byte of the communication information frame) with the lower 8 bits of the 16-bit CRC register and put the result in the CRC register.

4.3 Shift the contents of the CRC register to the right by one bit (towards the lower bit) and fill the highest bit with 0, and check the shifted-out bit after the right shift;

4.4 If the shift-out bit is 0, repeat the third step(move to right by one bit again) . If the shift-out bit is 1, CRC register and polynomial A001 (1010 0000 0000 0001) XOR;

4.5 Repeat steps 3 and 4 until 8 times to the right, so that the entire 8-bit data has been processed;

4.6 Repeat steps 2 to 5 to process the next byte of the communication information frame;

4.7 After calculating all the bytes of the communication information frame according to the above steps, exchange the high and low bytes of the 16-bit obtained CRC register .

4.8 The final content of the CRC register is: CRC code.

Attached: CRC calculation C language source code

```
unsigned int GET_CRC(unsigned char * buf,unsigned charnum)
{
        unsigned  chari,j;
        unsigned int WCRC        =        0xffff;
        for(i=0;i<num;i++)
        {
                WCRC        ^=        (unsigned int)(buf[i]);    // Cyclic redundancy check
                for(j=0;j<8;j++)
                {
                        if(WCRC&1)
                        {
                                WCRC        >>=        1;
                                WCRC        ^=         0XA001;
                        }
                        else
                        WCRC        >>=        1;
                }
        }
        return(WCRC);                //        obtain CRC code
}
```

X. AX9L parameter address reflection table

Three-phase intelligent power meter address definition							
Read-only parameter communication list							
No.	reflection add.	Variable name	register	Data type	read/write	unit	note
1	0x4000	Phase voltage A	2	long	R	0.1V	
2	0x4002	Phase voltage B	2	long	R	0.1V	
3	0x4004	Phase voltage C	2	long	R	0.1V	
4	0x4006	Line voltage AB	2	long	R	0.1V	
5	0x4008	Line voltage BC	2	long	R	0.1V	
6	0x400a	Line voltage CA	2	long	R	0.1V	
7	0x400c	Phase current A	2	long	R	0.001A	
8	0x400e	Phase current B	2	long	R	0.001A	
9	0x4010	Phase current C	2	long	R	0.001A	
10	0x4012	Active power A	2	long	R	0.1W	
11	0x4014	Active power B	2	long	R	0.1W	
12	0x4016	Active power C	2	long	R	0.1W	
13	0x4018	Total active power	2	long	R	0.1W	
14	0x401a	Reactive power A	2	long	R	0.1var	
15	0x401c	Reactive power B	2	long	R	0.1var	
16	0x401e	Reactive power C	2	long	R	0.1var	
17	0x4020	Total reactive power	2	long	R	0.1var	
18	0x4022	Apparent power A	2	long	R	0.1VA	
19	0x4024	Apparent power B	2	long	R	0.1VA	
20	0x4026	Apparent power C	2	long	R	0.1VA	
21	0x4028	Total apparent power	2	long	R	0.1VA	
22	0x402a	Power factor A	2	long	R	0.001	
23	0x402c	Power factor B	2	long	R	0.001	
24	0x402e	Power factor C	2	long	R	0.001	
25	0x4030	Total power factor	2	long	R	0.001	
26	0x4032	Frequency	2	long	R	0.01HZ	
27	0x4034	Total Kwh	2	long	R	0.01kWh	LED display type power meter do not have this function
28	0x4036	Total Kvarh	2	long	R	0.01kvarh	
29	0x4038	Forward Kwh	2	long	R	0.01kWh	
30	0x403a	Backward Kwh	2	long	R	0.01kWh	
31	0x403c	Forward Kvarh	2	long	R	0.01kvarh	
32	0x403e	Backward Kvarh	2	long	R	0.01kvarh	

Reserve and extension							
system setting parameters list							
1	0x4800	Link mode	1	short	R	no decimal point	attached 1
2	0x4801	Voltage transform PT1	1	short	R/W	0.1kV	Fixed decimal point
3	0x4802	Voltage transform PT2	1	short	R/W	0.1V	
4	0x4803	Current transform CT1	1	short	R/W	1A	fixed decimal point
5	0x4804	Current transform CT2	1	short	R/W	0.1A	
6	0x4805	communication address 1	1	short	R/W	no decimal point	
7	0x4806	Baud rate 1	1	short	R/W		attached 2
8	0x4807	Data format 1	1	short	R/W		
9	0x4808	communication address 2	1	short	R/W		reserve
10	0x4809	Baud rate 2	1	short	R/W		
11	0x480a	Data format 2	1	short	R/W		
12	0x480b	switch output	1	short	R		attached 4
13	0x480c	switch input	1	short	R		attached 5
14	0x480d	Remote control input	1	short	R/W		attached 6
Reserve and extension							
Alarm parameters list							
1	0x4900	1st alarm mode	1	short	R/W	no decimal point	attach 3
2	0x4901	1st alarm unit	1	short	R/W		
3	0x4902	1st alarm unit value	1	short	R/W	0.1	fixed decimal point
4	0x4903	1st hysteresis value	1	short	R/W	0.1	
5	0x4904	1st alarm output mode	1	short	R	no decimal point	
6	0x4905	1st alarm action delay	1	short	R/W	0.1s	fixed decimal point
7	0x4906	1st alarm reset delay	1	short	R/W	0.1s	
The 2nd or more alarm communication addresses read from the end of 1st alarm address extension.							
Reserve and extension							

Attached 1: Wire connection mode description:

reflection address	value	Display characters	explanation
0X4800	0	3-4	3 phase 4 wire connection
	1	3-3	3 phase 3 wire connection

Attached 2: Communication baud rate

reflection address	value	Display characters	explanation
0X4805	0	1.2K	baud rate 1200bps
	1	2.4K	baud rate 2400bps
	2	4.8K	baud rate 4800bps
	3	9.6K	baud rate 9600bps
	4	19.2K	baud rate 19200bps

Attached 3: Alarm unit

reflection address	value	Display characters	explanation
0X4901、0X4908 0X4A01、0X4A05	0	1	unit is 1
	1	K	unit is K
	2	M	unit is M

Attached 4: Alarm output status indication

reflection address	Sequence No.	Alarm	explanation
0X480B	BIT2-BIT15	not used	not used
	BIT1	alarm 2	0: no alarm action
			1: alarm action
	BIT0	alarm 1	0: no alarm action
			1: alarm action

Attached 5 : Switch input status indication

reflection address	Sequence No.	Alarm	explanation
0X480C	BIT4-BIT15	not used	not used
	BIT3	switch input 4	0: disconnect
			1: connect
	BIT2	switch input 3	0: disconnect
			1: connect
	BIT1	switch input 2	0: disconnect
			1: connect
	BIT0	switch input 1	0: disconnect
			1: connect

Attached 6 : Remote control output command explanation

reflection address	Sequence No.	Alarm	explanation
0X480D	BIT2-BIT15	not used	not used
	BIT1	remote control 2	0: disconnect
			1: connect
	BIT0	remote control 1	0: disconnect
			1: connect