3 Phase Power Meter User Manual

AX7E-C series

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

Features:

⊙Measuring parameters: voltage/current/active power/reactive power/ frequency/power factor, etc.
⊙2 DI and 2 DO.
⊙True RMS measurement.
⊙With RS485 communication port, ModBus RTD protocol.
⊙It has forward and reverse active energy recording functions, which can record the consumed and generated energy respectively.

Version: KKDS7E-C01ET01-A/1-20231011

⚠Warming:

1. Accidents may happen and product may be damaged if failure to follow the instructions in this manual.
2. The information in this user manual may be modified without prior notice.
3. The company reserves the right for information updation.

I. Model Illustration

AX7E – □□□

- Input: 38:3phase with RS485 30:3 phase withtout RS485
- Alarm: RC:2 alarms A: No alarm
- Measure: V:3 phase voltage A:3 phase current P:3 phase voltage, current and power
- Display: E: LED
- Dimension: 7:72H×72W×72.5L (mm)
- AX series 3 phase power meter

II. Ordering Information

Model	Measured signal	Communication	DI	DO
AX7E-V-A30	3 phase voltage	No	No	No
AX7E-A-A30	3 phase current	No	No	No
AX7E-W-RC38	3 phase voltage,current, power	1 x RS485	No	2

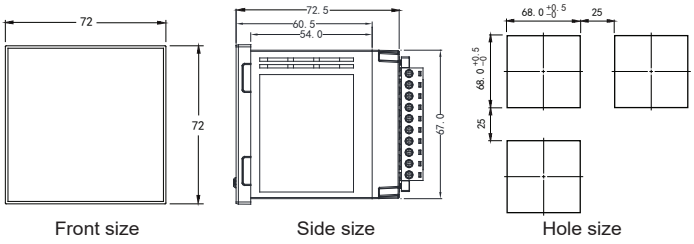
Remark: Alternative DI & DO function.

III. Specification

Connection	3 phase 3 wire / 3 phase 4 wire
Voltage rating	AC 10-480V(L-L)
Voltage overload	Continuous:1.2 times; Instantaneous: 2 times/2S
Voltage consumption	<1VA (per phase)
Voltage impedance	≥300KΩ
Voltage accuracy	RMS measurement, accuracy 0.5 class
Current rating	AC 0.025 ~ 5A
Current overload	Continuous:1.2 times; Instantaneous: 10 times/2S
Current consumption	<0.4VA (per phase)
Current impedance	<20mΩ
Accuraccy	RMS measurement, accuracy 0.5 class
Frequency	45 ~ 60Hz, accuracy 0.01Hz
Power	Active/reactive/apparent power, accuracy: 0.5 class
Energy	Active energy Class 1, reactive energy Class 2
Display	3 rows of LED display instantaneous electrical parameters

Power supply	AC/DC 100 ~ 240V (85 ~ 265V)
Power consumption	≤5VA
Output port	RS-485, MODBUS-RTU protocol
DI	2 DI (dry contact mode), alternative 2 alarms or 2 DI .
Alarm output	2 DO output, alternative 250VAC/3A or 30VDC/5A.
Working Environment	Temperature: -10～50℃, Humidity: <85% RH; No corrosive gas; Altitude ≤2500m
Storage environment	-40 ~ 70℃
Isolation withstand voltage	Power supply and 485 interface, DI interface ≥ DC 2000V
Insulation	Input, output, power supply to the housing > 5MΩ
Dimension	72 W×72H×72.5L (mm)
Weight	0.5kg

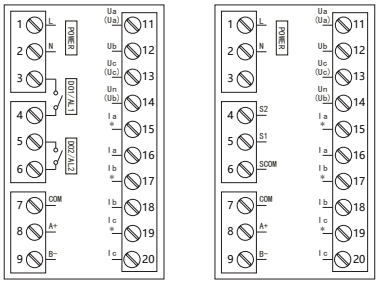
IV. Dimension (Unit: mm)



Front size Side size Hole size

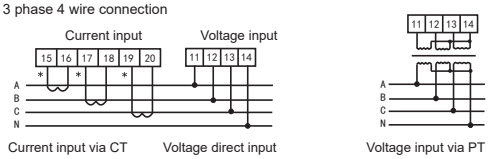
V. Connection

Alarm output version DI Version



Note: Please subject to the connection on the meter if any changes.
Note: For voltage input terminals, the numbers in brackets means the 3 phase 3 wire connection.

Method 1 (3 CT): 3 phase 4 wire connection



Method 2 (2 CT): 3 phase 3 wire connection (for energy measurement occasions)

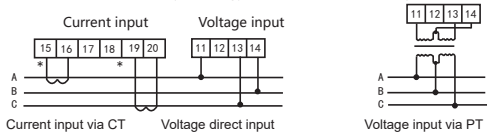
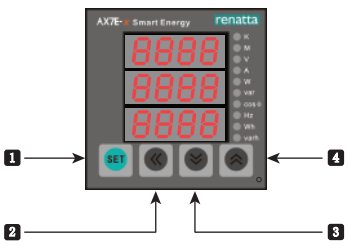


Illustration:
A. Voltage input: Input voltage should not be higher than the rated input voltage of meter, otherwise a PT should be used.
B. Current input: Standard rated input current is 5A. A CT should be used when the input current is higher than 5A. If some other meters are connected with the same CT, the connection should be serial for all meters.
C.Be sure that the input voltage and current is corresponding to the input current, they should have the same phase sequence and direction,otherwise data and sign error may occur (power and energy).
D.The connection mode of meter which is connected to power network should depend on the CT quantity. For 2pcs of CT, it should be 3 phase 3 wire connection. For 3 pcs of CT, it should be 3 phase 4 wire connection. Meter wire connection, the input network Link setting in the software menu should accord to the connection mode of the measured load. Otherwise, the measured voltage or power is incorrect.

Note:
1. Be sure the connection is correct, pay attention to the phase sequence when inputting voltage signals.
2. The current signal input must be connected according to the same name terminal marked on the diagram.
3. The connection should be consistent with the setting of "LIN" in the user menu.
4. To avoid malfunction of the leakage switc, it is recommended to isolate the power supply of the meter the main test line.

VI: Panel Illustration



Note: The active energy and reactive energy values are distinguished by display units.

Symbol	Illustration
K	Kilo unit
M	Million unit
V	Voltage display
Hz	Frequency display
A	Current display
W	Active power display
Var	Reactive power display
cosø	Power factor display
Wh	Active energy display
varh	Reactive energy display

No.	Symbol	Name	Function
1	SET	Enter key	Press this key more than 3s to enter the menu;confirm the set value
2	«	Left key	In menu operation, it can be used as return key; while modification, it can be used as shift key.
3	»	Decrease key	In menu operation, it is used to enter data setting; decrease value
4	^	Increase key	In menu operation, it is used to enter data setting; increase value

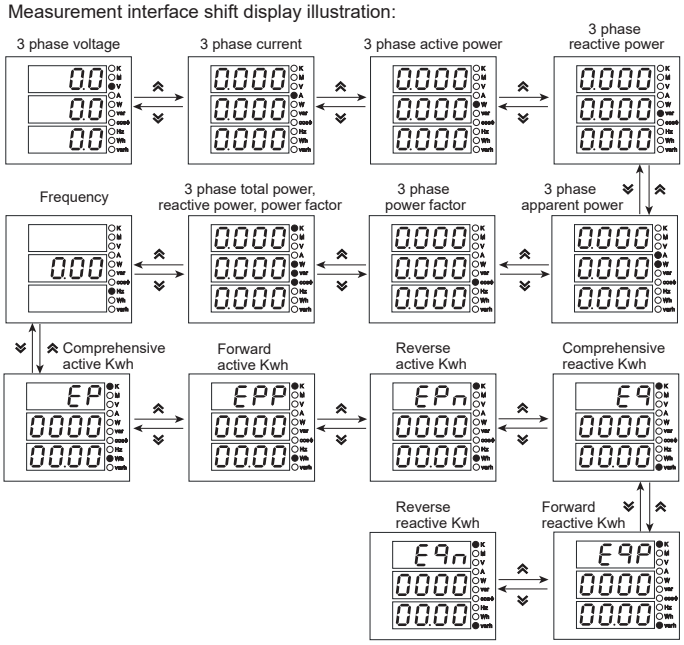
Measurement display interface illustration:

1. Under 3 phase 4 wire measuring status, press " ⩓ / ⩔ " key to shift display 3 phase voltage/current/active power/reactive power/apparent power/power factor, total power, frequency, etc.
2. In the measurement state, the button " ⩓/ ⩔ " is for shift display of the total active energy (algebraic sum), forward active energy, reverse active energy, total reactive energy (algebraic sum), forward reactive energy, and reverse reactive energy.

Note: The indication of 26 letters in LED

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

Measurement interface shift display illustration:



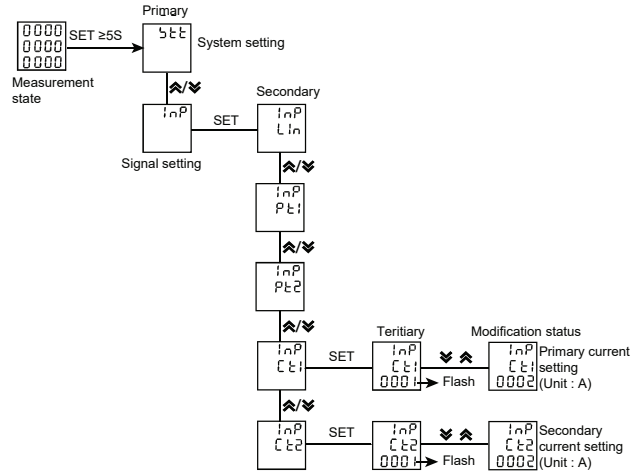
VII. Menu Modification Illustration

In user menu state

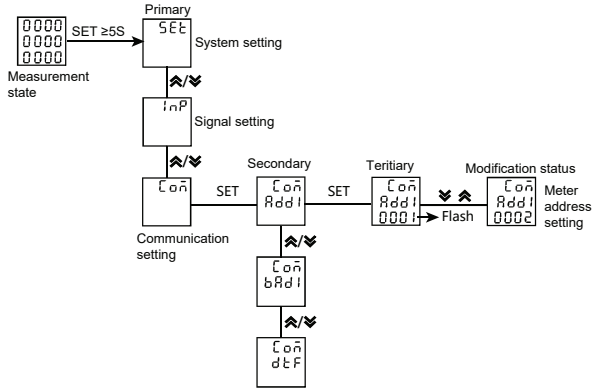
1. If the current display is primary or secondary, press the "SET" to enter the next level display. Press " ⩔ ", " ⩓ " to change the menu item or menu sub-item.
2. If the current display is secondary or tertiary, press the " ⩽ " key to return to the previous menu display.
3. If the current display is teritiary, press " ⩔ " and " ⩓ " and the data will flash. Press " ⩔ " and " ⩓ " to modify it. Press " ⩽ " to flash and shift, and press "SET" to save the set data.
4. After modification, long press "SET" for 5s to exit the user menu and enter the measurement state. You can also press " ⩽ " to exit the menu step by step.

Note: menu modification example

Example 1. current ratio setting method



Example 2. communication address setting method



Menu structure and function description (Note: The parameter's decimal points in the menu are fixed decimal points)

Primary	Secondary	Tertiary	Description
System setting SEt	Clear energy CLrE	0000	Input “1111” to clear energy; Input “1234” to reset factory default
	Password USEr	0000	Modify password, factory default “0000”, no pass word. Pleae remember it well after modification.
	Page time PGCH	0000	Page turning time under measurement page, unit: second. No page turning when the value is "0".
	Primary/ secondary selection PtCt	0000	Value "0000": display secondary Kwh Value"0001": display primary Kwh
	Software version UEr	3.0	Software version code, can’t be modified.
Signal setting InP	Network Lin	3-3 / 3-4	Select the input network of the measurement signal, 3 phase 3 wire or 3 phase 4 wire
	Voltage ratio Pt1	0.1-999.9	CT primary value, eg: 10KV/100V, set the value be 10.0, low voltage 220/380 does not need to set, unit: kV
	Voltage ratio Pt2	10.0-999.9	CT secondary value, eg: 10KV/100V, set the value be 100, low voltage 220/380 does not need to set, unit: V
	Current ratio Ct1	1-9999	CT primary value, eg: 200/5A, set to be 200, unit : A
	Current ratio Ct2	1.0-999.9	CT secondary value, eg: 200/5A, set to be 5; eg: 200/1A, set to be 1, unit : A
Comm. setting Con	Address Add	1-247	Meter address range
	Baud rate brd	4b8/9b6 19b2	Baud rate 4k8 means 4800, 9k6 means 960019K2 means 19200
	Data sequence dtF	H-L / L-H	Data sequence: high register ahead or low register ahead
	Parity bit PrtY	no/EvEn/odd	No parity / even parity / odd parity
Alarm setting AL (Reference during alarm output version)	Alarm mode Ad1	0-58	When value is DO, it is remote control mode, otherwise it is alarm mode, pls refer to“alarm output parameters”
	Alarm value unit Ut1	1/U/n	1: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 display unit), decimal point cannot be modified
	Alarm hysteresis HY1	0-999.9	1st alarm histerisis setting (unit: standard display unit), decimal point cannot be modified
	Alarm relay selection oUt1	rLY1/rLY2	1st alarm relay output for selection
	Delay time dLA1	0-99.9	Delay time, unit: second, decimal point can’t be modified
	Alarm ending time dLb1	0-99.9	Reset time, unit: second, decimal point can’t be modified

Please refer to the 1st channel for how to set parameters related to the second channel alarm.

VIII. Output function (For reference when alarm output version selected)

1. DO1 and DO2 functions can be used to "remote control" electrical equipment; when using this function, the alarm mode should be selected as "0" (DO), otherwise DO1 and DO2 will be output as alarm AL1 and AL2; the DO1 and DO2 functions are controlled through RS485 Interface writing.
2. Alarm function: after the meter is powered on and runs stably for more than 5 s econds, the alarm starts to operate. (see table below)

Alarm output parameter comparison table

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

IX. 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 ddress variable seizes wo 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 he same packe 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.

■ 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
}
```

■ AX7E 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	
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		reserved
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	
2	0x4901	1st alarm unit	1	short	R/W		attach 3
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