MultiMeter
Multi-circuit Smart Meter
MPM (4000) Series

Communication Protocol

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INDEX

1 Modbus Communication Overview

1.1 Modbus Communication Settings

Before communicating with a device using the Modbus protocol, configure the following settings:

Parameters	Valid Value	Default Value
Address (Slave ID)	1~247	1
Baud rate	-2400 -4800 -9600 -19200 -38400 -57600 -115200	9600
Data bit	Fixed 8 bits	8
Parity	– No parity – Odd parity – Even parity	No parity
Stop bit	- 1 -2	1

1.2 Function Code

Function codes are used to instruct the device how to process the command. The following table shows the available function codes and their descriptions.

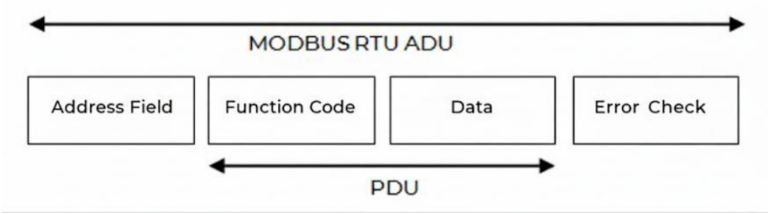
Function Code (decimal)	Hexadecimal	Name	Function
3	0x03	Read holding registers	Get measurement or configuration

			information
16	0x10	Writing multiple holding registers	Configure parameter settings

1.3 Modbus-RTU Communication

1.3.1 Modbus - RTU Data Frame

The Modbus RTU data frame consists of four parts: address field, function code, data and error check.



1.3.2 Function Code (0x3=3) Operation Instructions

Function code (0x03=3) is used to read register parameters. The request and return data formats are as follows:

Request data format :

NO.	Name	Type	Range (Decimal)	Description
1	Address	UInt8	1-247	
2	Function code	UInt8	3	
3	Starting register address	UInt16	-	High byte first (sending order)
4	Number of registers	UInt16	1-125	High byte first (sending order)
5	CRC-16 check	UInt16	-	Low byte first (sending order)

Return data format :

NO.	Name	Type	Range (Decimal)	Description

1	Address	UInt8	1-247	
2	Function code	UInt8	3	
3	Read register bytes	UInt8	-	Read register number *2
4	Value of register 1	UInt 16	-	High byte first
5	…	UInt 16	-	High byte first
6	Value of register n	UInt 16	-	High byte first
7	CRC-16 check	UInt16	-	Low byte first

For example:

NO.	Name	Type	Decimal	Hexadecimal	Description
1	Device address	UInt8	1	0x01	
2	Function code	UInt8	3	0x03	
3	Starting register address	UInt16	1010	0x03F2	
4	Number of registers	UInt16	6	0x0006	
5	CRC -16 check	UInt16	32612	0x7F64	Low byte first (sending order)

Read the voltage values of A, B, and C (the starting address of the voltage register is: 1010):

The byte order of sending is as follows:

01 03 03 F2 00 06 64 7F

Return data:

01 03 0C 43 5C 00 00 43 5D 00 00 43 5E 00 00 14 AC

NO.	Name	Type	Hexadecimal	Decimal
1	Device address	UInt8	01	1
2	Function code	UInt8	03	3
3	Read register bytes	UInt8	0C	12
4	Phase A voltage	float32	435C0000	220V
5	Phase B voltage	float32	435D0000	221V

6	Phase C voltage	float32	435E0000	222V
7	CRC-16 check	UInt16	14AC	

1.3.3 Function Code (0x10=16) Operation Instructions

Function code (0x10=16) is used to configure parameters. Its request and return data formats are as follows:

Request data format :

NO.	Name	Type	Range (Decimal)	Description
1	Address	UInt8	1-247	
2	Function code	UInt8	16	
3	Register starting address	UInt16	-	High byte first (sending order)
4	Number of registers	UInt16	1-123	High byte first (sending order)
5	Register bytes	UInt8		Number of registers *2
6	Write value to register 1	UInt16	-	High byte first (sending order)
7	…	UInt16	-	High byte first (sending order)
8	Write value to register n	UInt16	-	High byte first (sending order)
9	CRC-16 check	UInt16	-	Low byte first (sending order)

Return data format :

NO.	Name	Type	Range (Decimal)	Description
1	Address	UInt8	1-247	
2	Function code	UInt8	16	
3	Register starting	UInt16	300	High byte first

	address			
4	Number of registers	UInt16	1-123	High byte first
5	CRC-16 check	UInt16	-	Low byte first

Notice!

Function code (0x10=16) can only write data to the "configuration instruction register" and can only write data to the register starting from address 300.

For example:

Configure the device time (command=1200, set to: 2022-11-1 12:20:00) .

NO.	Name	Type	Decimal	Hexadecimal	Description
1	Device address	UInt8	1	01	
2	Function code	UInt8	16	10	
3	Register starting address	UInt16	300	012C	Configuration register starting address
4	Number of configuration registers	UInt16	7	0007	Configuration time instructions + parameters Occupies a total of 7 registers
5	Data length	UInt8	14	0E	Number of configuration registers*2
6	Register 300 write value	UInt16	1200	0 4 B0	Configuration time command code 1200
7	Register 301 write value	UInt16	2022	07E6	Year = 2022
8	Register 302 write value	UInt16	11	000 B	Month = 11
9	Register 303 write value	UInt16	1	000 1	Day=1

10	Register 304 write value	UInt16	12	000C	Hour = 12
11	Register 305 write value	UInt16	20	00 14	Minute = 20
12	Register 305 write value	UInt16	0	0000	Second = 0
13	CRC -16 check	UInt16	35524	8AC4	Low byte first (sending order)

The byte order of sending is as follows :

01 10 01 2C 00 07 0E 04 B0 07 E6 00 0B 00 01 00 0C 00 14 00 00 C4 8A

If the configuration data is correct, the following data will be returned:

01 10 01 2C 00 0 7 41 FE

NO.	Name	Type	Hexadecimal	Decimal
1	Device address	UInt8	01	1
2	Function code	UInt8	10	16
3	Register starting address	UInt16	012C	300
4	Number of registers	UInt16	0007	7
5	CRC-16 check	UInt16	41FE	

1.3.4 Error Response

Error response data format:

NO.	Name	Type	Decimal	Hexadecimal	Remark
1	Device address	UInt8	1-247	0x01-0xF7	
2	Function code	UInt8	(128+3) (128+16)	(0x80+0x03) (0x80+0x10)	
3	Error code	UInt8			

4	CRC-16 check	UInt16			Low byte first

Modbus error codes:

Code	Name	Description
0x01	Illegal function code	The function code used is not 3 or 16 supported by the device.
0x02	Illegal data address	The register data written or read is not within the address range supported by the device
0x03	Illegal data value	The data value written to the register does not meet the requirements
0x04	Device error	An unknown error occurred
0x10	Device data recording	When the device is recording data, it is forbidden to modify this parameter

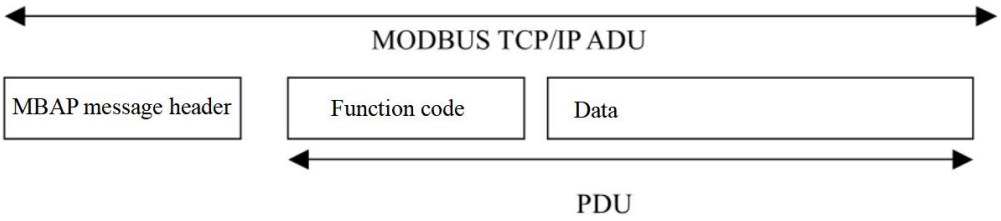
1.4 Modbus-TCP/IP Communication

Before performing Modbus-TCP/IP communication, you need to set the following parameters through the device interface:

Parameter	Valid Value	Default Value
IP address	-	192.168.1.31
Subnet mask	-	255.255.255.0
Gateway address	-	192.168.1.1
Modbus protocol port number	-	502

1.4.1 Modbus-TCP/IP Data Frame

Transmitted on TCP/IP Ethernet, the Modbus-TCP/IP data frame consists of three parts: message header, function code and data.



The MBAP message header (MBAP, Modbus Application Protocol) is divided into 4 fields, totaling 7 bytes .

Field	Length	Description	Client	Server
Transaction meta identifier	2 bytes	Identification code for the MODBUS request/response transaction	Initiated by the client	The server re-copies from the received request.
Protocol identifier	2 bytes	0=MODBUS protocol	Initiated by the client	The server re-copies from the received request.
Length	2 bytes	The number of bytes	Initiated by the client (request)	Server (response) started
Unit identifier	1 byte	Identification code of a remote slave connected to a serial link or other bus	Initiated by the client	The server re-copies from the received request.

The message header is 7 bytes long:

➢Transaction processing identifier: Used for transaction pairing. In the response, the MODBUS server copies the transaction identifier of the request.

➢Protocol identifier: Used for multiplexing within the system. The value 0 identifies the MODBUS protocol.

➢Length: The length field is the number of bytes in the next field, including the unit identifier and data field.

➢Unit Identifier: This field is used for routing within the system. It is used exclusively over Ethernet TCP / IP networks and MODBUS strings.

➢The gateway between serial links is used to communicate with MODBUS or MODBUS+ serial link slaves. The MODBUS client is set in the request.

➢The server MUST return this field with the same value in the response.

➢PDU consists of two parts: function code and data. Function code is used to distinguish functions, and data is used to explain specific meanings.

Function code	Data
8-Bits	N×8-Bits

1.4.2 Function Code (0x03=3) Operation Instructions

Function code (0x03=3) is used to read device register parameters. Its request data and return data formats are as follows:

Request data format:

NO.	Name	Type	Range (Decimal)	Description
1	Transaction unit identifier	UInt16		High byte first (sending order)
2	Protocol identifier	UInt16	0=MODBUS	High byte first (sending order)
3	Data byte length	UInt16		High byte first (sending order)
4	Unit identifier	UInt8		
5	Function code	UInt8	3	
6	Starting register address	UInt16	-	High byte first (sending order)
7	Number of registers	UInt16	1~125	High byte first (sending order)

Return data format:

NO.	Name	Type	Range (Decimal)	Description
1	Transaction unit identifier	UInt16		High byte first (sending order)
2	Protocol identifier	UInt16	0=MODBUS	High byte first (sending order)
3	Data byte length	UInt16		High byte first (sending order)
4	Unit identifier	UInt8		
5	Function code	UInt8	3	
6	Read register bytes	UInt8	-	Read register number*2
7	Value of register 1		-	High byte first
8	…		-	High byte first
9	Value of register n		-	High byte first

1.4.3 Function Code (0x10=16) Operation Instructions

Function code (0x10=16) can be used to write commands to the device and configure device parameters.

The request and return data formats of Modbus-TCP are as follows:

Request data format:

NO.	Name	Type	Range	Description
1	Transaction unit identifier	UInt16		High byte first (sending order)
2	Protocol identifier	UInt16	0=MODBUS	High byte first (sending order)
3	Data byte length	UInt16		High byte first (sending order)
4	Unit identifier	UInt8		

5	Function code	UInt8	16	
6	Register starting address	UInt16	300	High byte first (sending order)
7	Number of registers	UInt16	1~123	High byte first (sending order)
8	Register Bytes	UInt8		Number of registers*2
9	Write value to register 1	UInt16	-	High byte first (sending order)
10	…	UInt16	-	High byte first (sending order)
11	Write value to register n	UInt16	-	High byte first (sending order)

Return data format:

NO.	Name	Type	Range	Description
1	Transaction unit identifier	UInt16		High byte first (sending order)
2	Protocol identifier	UInt16	0=MODBUS	High byte first (sending order)
3	Data byte length	UInt16		High byte first (sending order)
4	Unit identifier	UInt8		
5	Function code	UInt8	16	
6	Register starting address	UInt16	300	High byte first
7	Number of registers	UInt16	1~12 3	High byte first

Notice!

Function code (0x10=16) can only write data to the "configuration command register", that is, it can only write data to the register starting from address 300.

1.4.4 Error Response

Error response data format:

NO.	Name	Type	Decimal	Hexadecimal	Description
1	Transaction unit identifier	UInt16	0	0	
2	Protocol identifier	UInt16	0	0	
3	Data byte length	UInt16	3	0003	
4	Unit identifier	UInt8	1	01	
5	Function code	UInt8	(128+3) (128+16)	(0x80+0x03) (0x80+0x10)	
6	Error Code	UInt8			

Modbus error codes:

Code (Hexadecimal)	Name	Description
0x01	Illegal function code	The function code used is not supported by the device
0x02	Illegal data address	The register data written or read is not in the

Code (Hexadecimal)	Name	Description
		supported address range
0x03	Illegal data value	The data value written to the register does not meet the requirements
0x04	Device error	An unknown error occurred

1.5 List of Data Types

The following table lists the data types used in this manual.

Type	Description	Range
UInt16	Unsigned 16-bit integer	0–65535
Int16	Signed 16-bit integer	-32768–+32767
UInt32	Unsigned 32-bit integer	0–4 294 967 295
UInt64	Unsigned 64-bit integer	0–18 446 744 073 709 551 615
UTF8	8-bit UTF encoding	Multibyte Unicode encoding
Float32	32-bit floating point	Standard IEEE floating-point data (single precision)
Date Time	Date and time types	-
Time	Time type	-
IPaddr	IP address	-

1.5.1 Date Time Detailed Explanation

Byte	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Years (2000–2099)															
2	Month (1–12)								Day(1–31)							
3	Hour (0–23)								Minute (0–59)							
4	Second (0–59)															

1.5.2 Detailed Explanation of the Time Type

Byte	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Hour (0–23)															
2	Minute (0–59)															
3	Second (0–59)															

1.5.3 Ipaddr Format

Byte	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	addr1(0–255)								addr2(0–255)							
2	addr3(0–255)								addr4(0–255)							

1.6 Register List Format

The register table contains the following columns :

Category	Address	REG Address	Data Type	REG Length (U16)	Attribute	Unit	RW	Name

- Category: Used to refer to the meaning of registers
- Address: Modbus data address. The data address in this manual is in decimal format.
- REG address : Modbus data address. The data address in this manual is in hexadecimal format.
- Type: Encoded data type.
- REG length: Indicates the size of the 16-bit data

- Attribute: Register parameter specification
- Unit: The unit of the register value
- RW: Read and write
- Name: Introduce the function of this register

1.7 Register Byte Order

The device uses the MSB, high byte first order. When a data type exceeds 1 byte, the high byte comes first whether it is sent or received.

For example, if the data type of IA is Float32 (ABCD) and the length is 4 bytes, the received byte order is ABCD, first receiving A, then B, then C, and finally D; that is, the high byte comes first.

1.8 Register Address

The Modbus register address of the device is the real address, without offset. When using a PLC device to read this device, you need to add 1 to the read address. Because the PLC device address is 1-based, the address is automatically decremented by 1 when sending.

1.9 Configuration Mechanism and Feedback

All configuration operations are implemented uniformly through the following process:

- Use function code 0x10 (16) to write to the "Configuration Command Register" with a starting address of 300
- The write structure consists of:
  - Register 300: Configuration command code (e.g. 1001 for wiring mode)
  - Register 301 starts: command parameters
- Feedback results after execution is completed:
  - Address 424: Return the executed command number

• Address 425: Return status code, 0 for success, 80~83 for error codes

Register address	Content	Size (16 bits)	Data (Example)
424	Configuration command code	1	1001 (Set time)
425	Result	1	0 = Valid operation 80 = Invalid command code 81 = Invalid command parameter 82 = Invalid number of command parameters 83 = Operation not performed

2 Configuration Command List

When the device is recording data, you need to turn off data recording before configuring parameters, otherwise a configuration command error will be returned.

2.1 System parameter settings

Config. Address	Name	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1001	1001: Set system parameters
301	Parameter 1	1	UInt16	-	0,1,2,3,4,5	Wiring method 0= 3 P4W_4CT 1= 3 P4W_3CT 2= 3 P3W_3CT 3= 3 P3W_2CT 4=1P3W 5=1P2W
302	Parameter 2	1	UInt16	Hz	50,60	Grid frequency
303	Parameter 3	1	UInt16	V	1-65535	Nominal voltage (Not including VT ratio)

						Default value: 220
304-305	Parameter 4	2	UInt32	-	1-99999999	VT ratio , magnification 10000 times =Pri/Sec *10000 Default value: 10000
306	Parameter 5	1	UInt16	V	0~65535	Minimum measurement voltage , magnified 1000 times = actual value *1000 Default value: 1000

2.2 ABC Phase Current Transformer Settings

Config. Address	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1004,11004,21004,31004	1004: Configure X1 channel 11004: Configure X2 channel 21004: Configure X3 channel 31004: Configure X4 channel
301	Parameter 1	1	UInt16	-	0,1	ABC phase current transformer type 0 = Rogowski coil 1 = VCT
302	Parameter 2	1	UInt16	-	0,1	N-phase current transformer type 0 = Rogowski coil 1 = VCT

2.3 ABC Phase Voltage Channel

Config. Address	Name	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1006,11006,21006,31006	1006: Configure X1 channel 11006: Configure X2 channel 21006: Configure X3 channel 31006: Configure X4 channel
301	Parameter 1	1	UInt16	-	0,1,2	Phase A voltage channel selection 0 = Voltage channel 1 (default) 1 = Voltage channel 2 2 = Voltage channel 3
302	Parameter	1	UInt16	-	0,1,2	Phase B voltage channel

Config. Address	Name	Size	Type	Unit	Range (decimal)	Description
	2					selection 0 = Voltage channel 1 1 = Voltage channel 2 (default) 2 = Voltage channel 3
303	Parameter 3	1	UInt16	-	0,1,2	Phase C voltage channel selection 0 = Voltage channel 1 1 = Voltage channel 2 2 = Voltage channel 3 (default)

2.4 ABC Phase Current Direction Setting

When the coil direction is inconsistent with the actual direction, this configuration can be used to modify the current direction

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1010,11010,21010,31010	1010: Configure X1 channel 11010: Configure X2 channel 21010: Configure X3 channel 31010: Configure X4 channel
301	Parameter 1	1	UInt16	-	0,1	Phase A current direction 0 = Forward (default) 1 = Reverse
302	Parameter 2	1	UInt16	-	0,1	Phase B current direction 0 = Forward (default) 1 = Reverse
303	Parameter 3	1	UInt16	-	0,1	Phase C current direction 0 = Forward (default) 1 = Reverse

2.5 ABC Phase Current Channel Setting

When the current and voltage do not correspond, this configuration can be used to modify the current channel selection so that the current and voltage correspond to each other .

Command	Operation	Size	Type	Unit	Range (decimal)	Description

Code						
300	Command	1	UInt16	-	1011,11011,21011,31011	1011: Configure X1 channel 11011: Configure X2 channel 21011: Configure X3 channel 31011: Configure X4 channel
301	Parameter 1	1	UInt16	-	0, 1, 2	Current A channel selection 0 = Current Channel 1 (default) 1 = Current channel 2 2 = Current channel 3
302	Parameter 2	1	UInt16	-	0, 1, 2	Current B channel selection 0 = Current channel 1 1 = Current channel 2 (default) 2 = Current channel 3
303	Parameter 3	1	UInt16	-	0, 1, 2	Current C channel selection 0 = Current channel 1 1 = Current channel 2 2 = Current channel 3 (default)

2.6 ABC Phase Current Transformer Calibration

Command Code	Operation	Size	Type	Unit	Range	Description
300	Command	1	UInt16	-	1012 ,11012,21012,31012	1012: Configure X1 channel 11012: Configure X2 channel 21012: ConfigureX3 channel 31012: Configure X4 channel
301	Parameter 1	1	UInt16	-	0,1	ABC phase current transformer type 0 = Rogowski coil 1 = VCT
302	Parameter 2	1	Int16	%	-9999~ 9999	Phase A ratio difference correction value, magnified 100 times = actual value *100
303	Parameter 3	1	Int16	%	-9999~ 9999	Phase B ratio difference correction value, magnified 100 times

						= actual value *100
304	Parameter 4	1	Int16	%	-9999~ 9999	Phase C ratio difference correction value, magnified 100 times = actual value *100
305	Parameter 5	1	Int16	°	-9999~ 9999	Phase A angle difference correction value, magnified 100 times = actual value *100
306	Parameter 6	1	Int16	°	-9999~ 9999	Phase B angle difference correction value, magnified 100 times = actual value *100
307	Parameter 7	1	Int16	°	-9999~ 9999	Phase C angle difference correction value, magnified 100 times = actual value *100

2.7 N-phase Current Transformer Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1013,11013,21013,31013	1013: Configure X1 channel 11013: Configure X2 channel 21013: Configure X3 channel 31013: Configure X4 channel
301	Parameter 1	1	UInt16	-	0,1	N -phase current transformer type 0 = Rogowski coil 1 = VCT
302	Parameter 2	1	Int16	%	-9999~ 9999	N phase difference correction value , magnified 100 times = actual value *100

2.8 Demand Parameter Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1060,11060,21060,31060	1060: Configure X1 channel 11060: Configure X2 channel 21060: Configure X3

						channel 31060: Configure X4 Channel
301	Parameter 1	1	UInt16	-	0,1	Demand calculation method 0 = Fixed 1 = Slide
302	Parameter 2	1	UInt16	minute	1-60	Demand calculation interval

2.9 Tariff Mode Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1070,11070,21070,31070	1070: Configure X1 channel 11070: Configure X2 channel 21070: Configure X3 Channel 31070: Configure X4 Channel
301	Parameter 1	1	UInt16	-	0,1	Rate switching mode 0 = Manual switch 1 = RTC toggle

2.10 Manual Tariff Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1071,11071,21071,31071	1071: Configure X1 channel 11071: Configure X2 channel 21071: Configure X3 Channel 31071: Configure X4 Channel
301	Parameter 1	1	UInt16	-	0 ~ 5	Manual tariff setting 0 = Tariff 1 1 = Tariff 2 … 5 = Tariff 6 (Note: This setting is only valid when the tariff mode is manual switching)

2.11 RTC Tariff Time Period Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1072,11072,21072,31072	1072: Configure X1 channel 11072: Configure X2 channel 21072: Configure X3 Channel 31072: Configure X4 Channel
301-303	Parameter 1	3	Time	-	-	Ta start time
304-306	Parameter 2	3	Time	-	-	Tb start time
307-309	Parameter 3	3	Time	-	-	Tc start time
310-312	Parameter 4	3	Time	-	-	Td start time
313-315	Parameter 5	3	Time	-	-	Te start time
316-318	Parameter 6	3	Time	-	-	Tf start time

2.12 RTC Tariff Selection Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1073,11073,21073,31073	1073: Configure X1 channel 11073: Configure X2 channel 21073: Configure X3 Channel 31073: Configure X4 Channel
301	Parameter 1	1	UInt16	-	0~5	Ta tariff setting 0 = tariff 1 1 = tariff 2 … 5 = tariff 6
302	Parameter 2	1	UInt16	-	0~5	Tb tariff setting
303	Parameter 3	1	UInt16	-	0~5	Tc tariff setting

304	Parameter 4	1	UInt16	-	0~5	Td tariff setting
305	Parameter 5	1	UInt16	-	0~5	Te tariff setting
306	Parameter 6	1	UInt16	-	0~5	Tf tariff setting

2.13 Setting the Min. Measurement Value of ABC Phase Current

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1100,11100,21100,31100	1 1 0 0: Configure X1 channel 1 1 1 0 0: Configure X2 channel 2 1 1 0 0: Configure X3 channel 3 1 1 0 0: Configure X4 channel
301	Parameter 1	1	UInt16	A	0~65535	Minimum measurement current of ABC phase Rogowski coil, magnified 1000 times = actual value *1000 Default value: 500
302	Parameter 2	1	UInt16	A	0~65535	ABC phase VCT minimum measurement current, magnified 1000 times = actual value *1000 Default value: 10

2.14 N-phase Current Min. Measurement Value Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1101,11101,21101,31101	1101: Configure X1 channel 11101: Configure X2 channel 21101: Configure X3 channel 31101: Configure X4 channel
301	Parameter 1	1	UInt16	A	0~65535	Minimum measurement current of N-phase Rogowski coil , magnified

						1000 times = actual value *100 0 Default value: 500
302	Parameter 2	1	UInt16	A	0~65535	N -phase VCT minimum measurement current, magnified 1000 times = actual value *1000 Default value: 10

2.15 ABC Phase Current Conversion Factor Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1110,11110,21110,31110	1110: Configure X1 channel 11110: Configure X2 channel 21110: Configure X3 channel 31110: Configure X4 channel
301-302	Parameter 1	2	UInt32	-	1-99999999	ABC phase Rogowski coil measurement current conversion factor, magnified 10000 times = actual value *10000 Default value: 10000 The Rogowski coil is multiplied by this factor (Note: This factor needs to be set when the Rogowski coil measures the CT secondary current.)
303-304	Parameter 2	2	UInt32	-	1-99999999	ABC phase VCT measurement current conversion factor , magnified 10000 times = actual value *10000 Default value: 10000 The current measured by VCT is multiplied by this factor (Note: When VCT measures the CT secondary terminal current, this factor needs to be set)

2.16 Device Parameters

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
Internal temperature of the device	50	R	2	Float32	℃	
Device model	60	R	10	UTF8	-	
Serial number	70	R	2	UInt32	-	
APP version number	72	R	1	UInt16	-	Format : XY
Date and time	75	R/WC	4	Date time	-	Reg.75: Year 2000~2099 Reg.76: Month (b15:b8), Day (b7:b0) Reg.77: Hour (b15:b8), Minute (b7:b0) Reg.78: Second

2.17 N-phase Current Conversion Factor Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1111,11111,21111,31111	1111: Configure X1 channel 11111: Configure X2 channel 21111: Configure X3 channel 31111: Configure X4 channel
301-302	Parameter 1	2	UInt32	-	1-99999999	N -phase Rogowski coil current conversion factor measurement , magnified 10000 times = actual value *10000 Default value: 10000 the Rogowski coil is multiplied by this factor (Note: This factor needs to be set when the Rogowski coil measures the CT secondary

						current.)
303-304	Parameter 2	2	UInt32	-	1-99999999	N -phase VCT measurement current conversion factor, magnified 10000 times = actual value *10000 Default value: 10000 The current measured by VCT is multiplied by this factor (Note: When VCT measures the CT secondary current, this factor needs to be set)

2.18 Time Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1200	1200: Configure device time
301	Parameter 1	1	UInt16	-	2000~2099	Year
302	Parameter 2	1	UInt16	-	1~12	Month
303	Parameter 3	1	UInt16	-	1~31	Day
304	Parameter 4	1	UInt16	-	0~23	Hour
305	Parameter 5	1	UInt16	-	0~5 9	Minute
306	Parameter 6	1	UInt16	-	0~5 9	Second

2.19 RS485 Communication Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1210	1210 : Configure RS485 communication
301	Parameter 1	1	UInt16	-	1~247	Slave Address
302	Parameter 2	1	UInt16	-	0~6	Baud rate 0 = 2400 1 = 4800 2 = 9600 3 = 19200

						4 = 38400 5 = 57600 6 = 115200
303	Parameter 3	1	UInt16	-	0, 1, 2	Parity 0 = None 1 = Odd 2 = Even
304	Parameter 4	1	UInt16	-	1, 2	Stop bit 1 = 1 bit 2 = 2 bits

2.20 LAN Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1220	1220 : Configure LAN communication
301	Parameter 1	1	UInt16	-	0,1	DHCP 0 = Disable (default) 1= Enable Note: When DHCP is enabled, IP is automatically obtained and the configured IP is invalid.
302-303	Parameter 2	2	IPaddr	-	-	IP address Default: 192.168.1.31
304-305	Parameter 3	2	IPaddr	-	-	Subnet mask Default: 255.255.255.0
306-307	Parameter 4	2	IPaddr	-	-	Gateway address Default: 192.168.1.1

2.21 Modbus-TCP/IP Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1221	1221: Configure Modbus-TCP/IP
301	Parameter 1	1	UInt16	-	0,1	Status 0 = Disable 1 = Enable (default)
302	Parameter 2	1	UInt16	-	-	Port number Default: 502

2.22 Web Server Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1223	1223: Configure the web server
301	Parameter 1	1	UInt16	-	0,1	Status 0 = Disable 1 = Enable (default)
302	Parameter 2	1	UInt16	-	-	Port number Default: 80

2.23 FTP Server Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1224	1224: Configure FTP server
301	Parameter 1	1	UInt16	-	0,1	Status 0 = Disable 1 = Enable (default)
302	Parameter 2	1	UInt16	-	-	Port number Default: 21

2.24 Clear Data Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	1301	1 301: Configuration clear data
301	Parameter 1	1	UInt16	-	1~5	1 : Clear the maximum and minimum values 2: Clear the maximum demand 3: Clear the tariff energy 4: Clear energy 5: Clear all the above values

2.25 Relay Control Mode Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	2000	2000 : Configure relay control mode
301	Parameter 1	1	UInt16	-	0,1	Relay control mode 0 = Manual control mode 1 = Alarm output control mode

2.26 Relay Manual Output Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	2001	2001: Configure relay control mode
301	Parameter 1	1	UInt16	-	0,1	Relay output control 0 = Relay output open 1 = Relay output closed (Note: This setting is only valid when the relay output control mode is manual control mode)

2.27 Alarm Parameter Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	3000,13000,23000,33000	3000: Configure X1 channel 13000: Configure X2 channel 23000: Configure X3 channel 33000: Configure X4 channel
301	Parameter 1	1	UInt16	-	-	Alarm ID
302	Parameter 2	1	UInt16	-	0, 1	Alarm function 0 = Disable 1=Enable
303	Parameter	1	UInt16	-	-	Reserved

	3					
304-305	Parameter 4	2	F loat 32	-	0,1 000000	Alarm activation threshold
306-307	Parameter 5	2	F loat 32	%	-	Alarm release point Percent error relative to the alarm activation threshold *For example:* *Overcurrent alarm activation threshold = 100A* *Alarm release point = 5%* *the current value is less than 100, 100 *5%=95A , the alarm is released.*
308	Parameter 6	1	UInt16	-	0 , 1	Buzzer output association 0 = No association 1 = Associated
309	Parameter 7	1	UInt16	-	0 , 1	Relay output association 0 = No association 1 = Associated

2.28 Data Recording Parameter Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	3100	3100: Configure data recording parameters
301~310	Parameter 1	10	UTF8	-	-	Record Name Note: 20 ASCII characters. If the number is less than 20, use null characters (0x00) to fill it. The characters that can be set are as follows: ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz0123456789-_
311-320	Parameter 2	10	UTF8	-	-	Operator Note: 20 ASCII characters. If the number is less than 20, fill it with null characters (0x 00) . The characters that can be set are as follows: ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz0123456789-_
321-330	Parameter 3	10	UTF8	-	-	Location Note: 20 ASCII characters. If the number is less than 20, use null characters (0x00) to fill it. The characters that can be set are as follows: ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz0123456789-_
331	Parameter 16	1	UInt16	Second	5-9999	Recording interval
332	Parameter 4	1	UInt16	-	2000~2099	Record start time-year

333	Parameter 5	1	UInt16	-	1~12	Record start time-month
334	Parameter 6	1	UInt16	-	1~31	Record start time-day
335	Parameter 7	1	UInt16	-	0~23	Recording start time - hour
336	Parameter 8	1	UInt16	-	0~59	Recording start time - minutes
337	Parameter 9	1	UInt16	-	0~59	Recording start time - seconds
338	Parameter 10	1	UInt16	-	2000~2099	Recording start time-year
339	Parameter 11	1	UInt16	-	1~12	Recording start time-month
340	Parameter 12	1	UInt16	-	1~31	Recording start time-day
341	Parameter 13	1	UInt16	-	0~23	Recording start time - hour
342	Parameter 14	1	UInt16	-	0~59	Recording start time - minutes
343	Parameter 15	1	UInt16	-	0~59	Recording start time - seconds

2.29 Data Recording Status Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	3101	3101: Configuration data recording status
301	Parameter 1	1	UInt16	-	0,1	Data recording status 0= Stop 1 = Enable

2.30 Device Restart Setting

Command Code	Operation	Size	Type	Unit	Range (decimal)	Description
300	Command	1	UInt16	-	6000	6000: Configure device restart
301	Parameter 1	1	UInt16	-	6485	Restart the device

3 Register List

3.1 Communication Parameter

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
Slave address	80	R/WC	1	UInt16	-	1-247
Baud rate	81	R/WC	1	UInt16	-	0=2400 1=4800 2=9600 3=19200 4=38400 5=57600 6=115200
Parity bit	82	R/WC	1	UInt16	-	0 = None 1 = Odd 2 = Even
Stop bit	83	R/WC	1	UInt16	-	1 = 1 bit 2 = 2 bits

3.2 LAN Communication Parameters

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
DHCP Status	90	R/WC	1	UInt16	-	D HCP : 0 = Disable 1= Enable Default: Disabled
IP address	91	R/WC	2	IPaddr	-	IP address : Default: 192.168.1.31

Subnet mask	93	R/WC	2	IPaddr	-	Subnet mask: Default: 255.255.255.0
Gateway Address	95	R/WC	2	IPaddr	-	Gateway address Default: 192.168.1.1

3.3 Modbus-TCP/IP

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
Status	100	R/WC	1	UInt16	-	Status: 0 = Disable 1=Enable Default: Enabled
Port number	101	R/WC	1	UInt16	-	Port Number: Default: 502

3.4 Web Server

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
Status	110	R/WC	1	UInt16	-	Status: 0 = Disable 1=Enable Default: Enabled
Port number	111	R/WC	1	UInt16	-	Port Number: Default: 80

3.5 FTP Server

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
Status	120	R/WC	1	UInt16	-	Status: 0 = Disable 1=Enable Default: Enabled
Port number	121	R/WC	1	UInt16	-	Port Number: Default: 21

3.6 Data Logger Parameter

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
Status	150	R/WC	1	UInt16	-	Status: 0 = Recording not started 1=Recording
Record name	151	R/WC	10	UTF8	-	Record Name: Note: 20 ASCII characters. If the number is less than 20, use null characters (0x00) to fill it.
Operator name	161	R/WC	10	UTF8	-	Operator : Note: 20 ASCII characters. If the number is less than 20, use null characters (0x00) to fill it.
Location	171	R/WC	10	UTF8	-	Location : Note: 20 ASCII characters. If the number is less than 20, use null characters (0x00) to fill it.
Recording interval	181	R/WC	1	UInt16	s	Recording interval
Recording start time	182	R/WC	4	Date time	-	Recording start time: Reg.75: Year 2000~2099 Reg.76: Month (b15:b8), Day (b7:b0) Reg.77: Hour (b15:b8), Minute (b7:b0) Reg.78: Milliseconds
Record end time	186	R/WC	4	Date time	-	Recording start time: Reg.75: Year 2000~2099 Reg.76: Month (b15:b8), Day (b7:b0) Reg.77: Hour (b15:b8), Minute (b7:b0) Reg.78: Milliseconds

3.7 Relay

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description

Output control mode	200	R/WC	1	UInt16	-	Relay output control mode 0 = Manual control mode 1 = Alarm output control mode
Relay output control	201	R/WC	1	UInt16	-	Relay output control 0 = Relay output open 1 = Relay output closed (Note: This setting is only valid when the relay output control mode is manual control mode)
Relay output status	202	R	1	UInt16	-	Relay output status 0 = open 1 = closed

3.8 Configuration Command Register

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
Command code	300	R/W	1	UInt16	-	
Command parameter 001	301	R/W	1	UInt16	-	
Command parameter 002	302	R/W	1	UInt16	-	
…	…	R/W	1	UInt16	-	
Command parameter 123	423	R/W	1	UInt16	-	
Configuration command code	424	R	1	UInt16	-	
Configuration results	425	R	1	UInt16	-	0 = Valid operation 80 = Invalid command code 81 = Invalid command parameter 82 = Invalid number of command parameters 83= Operation not performed

3.9 Grid Parameters

Register	Register Starting	Read/Write	Size	Type	Unit	Description

Alias	Address (decimal)					
Wiring mode	500	R/WC	1	UInt16	-	0= three-phase four-wire 4CT 1= three-phase four-wire 3CT 2 = three-phase three-wire 3CT 3 = three-phase three-wire 2CT 4 = One phase three wires 5 = One phase two wires
Grid frequency	501	R/WC	1	UInt16	Hz	
Nominal voltage	50 2	R/WC	1	UInt16	V	Does not include VT ratio
VT ratio	50 3	R/WC	2	UInt32	-	Actual value = read value / 10000
-	505	R	2	UInt32	-	reserve
Minimum measurement voltage	50 7	R/WC	1	UInt16	-	Actual value = read value / 100
Wiring mode	500	R/WC	1	UInt16	-	0= three-phase four-wire 4CT 1= three-phase four-wire 3CT 2 = three-phase three-wire 3CT 3 = three-phase three-wire 2CT 4 = One-phase three-wire 5 = One-phase two-wire

3.10 Current Transformer

List register address is X1 channel data

X2 channel data register address = X1 channel data register address + 10000

X3 channel data register address = X1 channel data register address + 20000

X4 channel data register address = X1 channel data register address + 30000

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
ABC phase current access	510	R/WC	1	UInt16	-	0 = Rogowski coil 1 = VCT

method						
ABC phase Rogowski coil Pri	511	R	2	UInt32	A	
ABC phase Rogowski coil Sec	513	R	2	UInt32	mV@50Hz mV@60Hz	Actual value = read value / 100
Nominal current of Rogowski wire of phase ABC	515	R	2	UInt32	A	
ABC phase VCT Pri	517	R	2	UInt32	A	
ABC phase VCT Sec	519	R	2	UInt32	m V	Actual value = read value / 100
ABC phase V CT nominal current	521	R	2	UInt32	A	
N-phase current transformer						
N -phase current access mode	5 30	R/WC	1	UInt16	-	0 = Rogowski coil 1 = CT
N -phase Rogowski wire Pri	5 31	R	2	UInt32	A	
N -phase Rogowski coil Sec	5 33	R	2	UInt32	mV@50Hz mV@60Hz	Actual value = read value / 100
N -phase Rogowski wire nominal current	535	R	2	UInt32	A	
N -phase VCT Pri	537	R	2	UInt32	A	
N -phase VCT Sec	5 39	R	2	UInt32	m V	Actual value = read value / 100
N -phase VCT nominal current	5 41	R	2	UInt32	A	

3.11 Current Direction

List register address is X1 channel data

X2 channel data register address = X1 channel data register address + 10000

X3 channel data register address = X1 channel data register address + 20000

X4 channel data register address = X1 channel data register address + 30000

Register	Register Starting	Read/Write	Size	Type	Unit	Description

Alias	Address (decimal)					
Phase A current direction	550	R / WC	1	UInt16	-	Phase A current direction 0 = Forward (default) 1 = Reverse
Phase B current direction	551	R / WC	1	UInt16	-	Phase B current direction 0 = Forward (default) 1 = Reverse
Phase C current direction	552	R / WC	1	UInt16	-	Phase C current direction 0 = Forward (default) 1 = Reverse

3.12 Current Channel Selection

List register address is X1 channel data

X2 channel data register address = X1 channel data register address + 10000

X3 channel data register address = X1 channel data register address + 20000

X4 channel data register address = X1 channel data register address + 30000

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
Phase A current channel	553	R / WC	1	UInt16	-	Phase A current channel 0 = Channel 1 (default) 1 = Channel 2 2 = Channel 3
Phase B current channel	554	R / WC	1	UInt16	-	Phase B current channel 0 = Channel 1 1 = Channel 2 (default) 2 = Channel 3
Phase C current channel	555	R / WC	1	UInt16	-	Phase C current channel 0 = Channel 1 1 = Channel 2 2 = Channel 3 (default)

3.13 Voltage Channel Selection

List register address is X1 channel data

X2 channel data register address = X1 channel data register address + 10000

X3 channel data register address = X1 channel data register address + 20000

X4 channel data register address = X1 channel data register address + 30000

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
Phase A voltage channel	557	R/WC	1	UInt16	-	Phase A voltage channel 0 = Channel 1 (default) 1 = Channel 2 2 = Channel 3
Phase B voltage channel	558	R/WC	1	UInt16	-	Phase B voltage channel 0 = Channel 1 1 = Channel 2 (default) 2 = Channel 3
Phase C voltage channel	559	R/WC	1	UInt16	-	Phase C voltage channel 0 = Channel 1 1 = Channel 2 2 = Channel 3 (default)

3.14 Current Transformer Correction Factor

List register address is X1 channel data

X2 channel data register address = X1 channel data register address + 10000

X3 channel data register address = X1 channel data register address + 20000

X4 channel data register address = X1 channel data register address + 30000

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
ABC phase current transformer						
A-phase Rogowski coil ratio difference correction	560	R/WC	1	UInt 16	%	Actual value = read value / 100
B-phase Rogowski coil ratio difference correction	561	R/WC	1	UInt 16	%	Actual value = read value / 100
C-phase Rogowski coil ratio difference correction	562	R/WC	1	UInt 16	%	Actual value = read value / 100

A-phase Rogowski coil angle difference correction	563	R/WC	1	UInt 16	°	Actual value = read value / 100
B-phase Rogowski coil angle difference correction	564	R/WC	1	UInt 16	°	Actual value = read value / 100
C-phase Rogowski coil angle difference correction	565	R/WC	1	UInt 16	°	Actual value = read value / 100
A-phase VCT ratio difference correction	566	R/WC	1	UInt 16	%	Actual value = read value / 100
B-phase VCT ratio difference correction	567	R/WC	1	UInt 16	%	Actual value = read value / 100
C-phase VCT ratio difference correction	568	R/WC	1	UInt 16	%	Actual value = read value / 100
A-phase VCT angle difference correction	569	R/WC	1	UInt 16	°	Actual value = read value / 100
B-phase VCT angle difference correction	570	R/WC	1	UInt 16	°	Actual value = read value / 100
C-phase VCT angle difference correction	571	R/WC	1	UInt 16	°	Actual value = read value / 100
N -phase current transformer						
N-phase Rogowski coil ratio difference correction	572	R/WC	1	UInt 16	%	Actual value = read value / 100
N-phase VCT ratio difference correction	573	R/WC	1	UInt 16	%	Actual value = read value / 100

3.15 Voltage and Current Phase Sequence

List register address is X1 channel data

X2 channel data register address = X1 channel data register address + 10000

X3 channel data register address = X1 channel data register address + 20000

X4 channel data register address = X1 channel data register address + 30000

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
Voltage and current phase sequence	605	R	1	UInt16	-	0 = Voltage phase sequence is correct, current phase sequence is correct 1 = Voltage phase sequence is wrong, current phase sequence is correct 2 = Voltage phase sequence is correct, current phase sequence is wrong 3 = Voltage phase sequence is wrong, current phase sequence is wrong

Note: When the current is less than 1% of the nominal current, the current phase sequence may be displayed incorrectly .

3.16 Minimum Current Measurement Value

List register address is X1 channel data

X2 channel data register address = X1 channel data register address + 10000

X3 channel data register address = X1 channel data register address + 20000

X4 channel data register address = X1 channel data register address + 30000

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
ABC phase current transformer						
Minimum measuring current of Rogowski coils of ABC phases	610	R/WC	1	UInt16	A	Actual value = read value / 100
ABC phase VCT minimum measurement current	611	R/WC	1	UInt16	A	Actual value = read value / 100
N-phase current transformer						

Minimum measuring current of N-phase Rogowski coil	612	R/WC	1	UInt16	A	Actual value = read value / 100
N-phase VCT minimum measurement current	613	R/WC	1	UInt16	A	Actual value = read value / 100

3.17 Current Conversion Factor

List register address is X1 channel data

X2 channel data register address = X1 channel data register address + 10000

X3 channel data register address = X1 channel data register address + 20000

X4 channel data register address = X1 channel data register address + 30000

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
ABC phase current transformer						
ABC phase Rogowski coil measurement current conversion factor	620	R/WC	2	UInt 32	A	Actual value = read value / 10000
ABC phase VCT measurement current conversion factor	622	R/WC	2	UInt32	A	Actual value = read value / 10000
N-phase current transformer						
N-phase Rogowski coil measurement current conversion factor	624	R/WC	2	UInt 32	A	Actual value = read value / 10000
N-phase VCT measurement current conversion factor	626	R/WC	2	UInt32	A	Actual value = read value / 10000

3.18 Tariff Parameter

List register address is X1 channel data

X2 channel data register address = X1 channel data register address + 10000

X3 channel data register address = X1 channel data register address + 20000

X4 channel data register address = X1 channel data register address + 30000

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
Current tariff	800	R	1	UInt16	-	Current tariff 0~5 = tariff 1 - tariff 6
Tariff switching mode	801	R/WC	1	UInt16	-	Tariff switching mode 0 = Manual switch 1 = RTC switch
Manual tariff selection	802	R/WC	1	UInt16	-	Manual tariff selection 0~5 = tariff 1 - tariff 6
RTC Ta start time	803	R/WC	3	Time	-	RTC Ta start time
RTC Tb start time	806	R/WC	3	Time	-	RTC Tb start time
RTC Tc start time	809	R/WC	3	Time	-	RTC Tc start time
RTC Td start time	812	R/WC	3	Time	-	RTC Td start time
RTC Te start time	8 15	R/WC	3	Time		RTC Te start time
RTC Tf start time	8 18	R/WC	3	Time	-	RTC Tf start time
RTC Ta tariff selection	8 21	R/WC	1	UInt16	-	Ta tariff selection 0~5 = tariff 1 - tariff 6
RTC Tb tariff selection	8 22	R/WC	1	UInt16	-	Tb tariff selection 0~5 = tariff 1 - tariff 6
RTC Tc tariff selection	8 23	R/WC	1	UInt16	-	Tc tariff selection 0~5 = tariff 1 - tariff 6
RTC Td tariff selection	8 24	R/WC	1	UInt16	-	Td tariff selection 0~5 = tariff 1 - tariff 6
RTC Te tariff selection	8 25	R/WC	1	UInt16	-	Te tariff selection 0~5 = tariff 1 - tariff 6
RTC Tf tariff selection	8 26	R/WC	1	UInt16	-	Tf tariff selection 0~5 = tariff 1 - tariff 6

3.19 Voltage, Current, Power, Power Factor

List register address is X1 channel data

X2 channel data register address = X1 channel data register address + 10000

X3 channel data register address = X1 channel data register address + 20000

X4 channel data register address = X1 channel data register address + 30000

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
Current						
IA	1000	R	2	Float32	A	Phase A current
IB	1002	R	2	Float32	A	Phase B current
IC	1004	R	2	Float32	A	Phase C current
Current Avg	1006	R	2	Float32	A	Average value of ABC three-phase current
IN	1008	R	2	Float32	A	Phase N current
Phase voltage						
UA	1010	R	2	Float32	V	UA-UN voltage
UB	1012	R	2	Float32	V	UB-UN voltage
UC	1014	R	2	Float32	V	UC-UN voltage
Phase Voltage Avg	1016	R	2	Float32	V	Average value of phase voltage of ABC three phases
U0	1018	R	2	Float32	V	Zero-sequence voltage
Line voltage						
UAB	1020	R	2	Float32	V	UA-UB voltage
UBC	1022	R	2	Float32	V	UB-UC voltage
UCA	1024	R	2	Float32	V	UC-UA voltage
Line Voltage Avg	1026	R	2	Float32	V	Average value of three-phase line voltage
Active power						
PA	1028	R	2	Float32	kW	Phase A active power

PB	1030	R	2	Float32	kW	Phase B active power
PC	1032	R	2	Float32	kW	Phase C active power
PTotal	1034	R	2	Float32	kW	Total active power
Reactive power						
QA	1036	R	2	Float32	kVAR	Phase A reactive power
QB	1038	R	2	Float32	kVAR	Phase B reactive power
QC	1040	R	2	Float32	kVAR	Phase C reactive power
QTotal	1042	R	2	Float32	kVAR	Total reactive power
Apparent power						
SA	1044	R	2	Float32	kVA	Phase A apparent power
SB	1046	R	2	Float32	kVA	Phase B apparent power
SC	1048	R	2	Float32	kVA	Phase C apparent power
STotal	1050	R	2	Float32	kVA	Total apparent power
Power factor						
PFA	1052	R	2	Float32	-	Phase A power factor
PFB	1054	R	2	Float32	-	Phase B power factor
PFC	1056	R	2	Float32	-	Phase C power factor
PFTotal	1058	R	2	Float32	-	Total power factor
Fundamental power factor						
DPFA	1060	R	2	Float32	-	Phase A fundamental power factor
DPFB	1062	R	2	Float32	-	Phase B fundamental power factor
DPFC	1064	R	2	Float32	-	Phase C fundamental power factor
DPFTotal	1066	R	2	Float32	-	Total fundamental power factor
Frequency						

FreqA	1068	R	2	Float32	Hz	Phase A frequency
FreqB	1070	R	2	Float32	Hz	Phase B frequency
FreqC	1072	R	2	Float32	Hz	Phase C frequency
FreqTotal	1074	R	2	Float32	Hz	Three-phase comprehensive frequency

3.20 Energy

There are two types of energy data types: Int64 and UInt32 , and the unit sizes of the two are different.

When the total energy reaches 1.0 x 10^9 kWh, 1.0 x 10^9kVarh, or 1.0 x 10^9kVah, the energy of each phase will be automatically reset to zero.

List register address is X1 channel data

X2 channel data register address = X1 channel data register address + 10000

X3 channel data register address = X1 channel data register address + 20000

X4 channel data register address = X1 channel data register address + 30000

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
Active energy - Int64						
EPAImp	2500	R	4	Int64	Wh	Phase A forward active energy
EPBImp	2504	R	4	Int64	Wh	Phase B forward active energy
EPCImp	2508	R	4	Int64	Wh	Phase C forward active energy
EPImp	2512	R	4	Int64	Wh	Total forward active energy

EPAExp	2516	R	4	Int64	Wh	Phase A reverse active energy
EPBExp	2520	R	4	Int64	Wh	Phase B reverse active energy
EPCExp	2524	R	4	Int64	Wh	Phase C reverse active energy
EPExp	2528	R	4	Int64	Wh	Total reverse active energy
Reactive energy - Int64						
EQAImp	2532	R	4	Int64	VAR	Phase A forward reactive energy
EQBImp	2536	R	4	Int64	VAR	Phase B forward reactive energy
EQCImp	2540	R	4	Int64	VAR	Phase C forward reactive energy
EQImp	2544	R	4	Int64	VAR	Total forward reactive energy
EQAExp	2548	R	4	Int64	VAR	Phase A reverse reactive energy
EQBExp	2552	R	4	Int64	VAR	Phase B reverse reactive energy
EQCExp	2556	R	4	Int64	VAR	Phase C reverse reactive energy
EQExp	2560	R	4	Int64	VAR	Total reverse reactive energy
Apparent energy - Int64						
ESA	2564	R	4	Int64	VAh	Phase A apparent energy
ESB	2568	R	4	Int64	VAh	Phase B apparent

						energy
ESC	2572	R	4	Int64	VAh	Phase C apparent energy
ES	2576	R	4	Int64	VAh	Total apparent energy
UInt32 energy						
Active energy - UInt32						
EPAImp	2600	R	2	UInt32	kWh	Phase A forward active energy
EPBImp	2602	R	2	UInt32	kWh	Phase B forward active energy
EPCImp	2604	R	2	UInt32	kWh	Phase C forward active energy
EPImp	2606	R	2	UInt32	kWh	Total forward active energy
EPAExp	2608	R	2	UInt32	kWh	Phase A reverse active energy
EPBExp	2610	R	2	UInt32	kWh	Phase B reverse active energy
EPCExp	2612	R	2	UInt32	kWh	Phase C reverse active energy
EPExp	2614	R	2	UInt32	kWh	Total reverse active energy
Reactive energy - UInt32						
EQAImp	2616	R	2	UInt32	kV	Phase A forward reactive energy
EQBImp	2618	R	2	UInt32	kV	Phase B forward reactive energy

EQCImp	2620	R	2	UInt32	kV	Phase C forward reactive energy
EQImp	2622	R	2	UInt32	kV	Total forward reactive energy
EQAExp	2624	R	2	UInt32	kV	Phase A reverse reactive energy
EQBExp	2626	R	2	UInt32	kV	Phase B reverse reactive energy
EQCExp	2628	R	2	UInt32	kV	Phase C reverse reactive energy
EQExp	2630	R	2	UInt32	kV	Total reverse reactive energy
Apparent energy - UInt32						
ESA	2632	R	2	UInt32	kVAh	Phase A apparent energy
ESB	2634	R	2	UInt32	kVAh	Phase B apparent energy
ESC	2636	R	2	UInt32	kVAh	Phase C apparent energy
ES	2638	R	2	UInt32	kVAh	Total apparent energy

3.21 Tariff Energy

There are two types of tariff energy data types: Int64 and UInt32 , and the unit sizes of the two are different.

When the tariff energy reaches 1.0 x 10^9 kWh, the tariff energy will be automatically reset to zero.

List register address is X1 channel data

X2 channel data register address = X1 channel data register address + 10000

X3 channel data register address = X1 channel data register address + 20000

X4 channel data register address = X1 channel data register address + 30000

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
Tariff energy-Int64						
ET1	2700	R	4	Int64	Wh	Tariff 1 active energy
ET2	2704	R	4	Int64	Wh	Tariff 2 active energy
ET3	2708	R	4	Int64	Wh	Tariff 3 active energy
ET4	2712	R	4	Int64	Wh	Tariff 4 active energy
ET5	2716	R	4	Int64	Wh	Tariff 5 active energy
ET6	2720	R	4	Int64	Wh	Tariff 6 active energy
Tariff energy - UInt32						
ET1	2750	R	2	UInt32	kWh	Tariff 1 active energy
ET2	2752	R	2	UInt32	kWh	Tariff 2 active energy
ET3	2754	R	2	UInt32	kWh	Tariff 3 active energy
ET4	2756	R	2	UInt32	kWh	Tariff 4 active energy
ET5	2758	R	2	UInt32	kWh	Tariff 5 active energy
ET6	2760	R	2	UInt32	kWh	Tariff 6 active energy

3.22 Demand Parameter

List register address is X1 channel data

X2 channel data register address = X1 channel data register address + 10000

X3 channel data register address = X1 channel data register address + 20000

X4 channel data register address = X1 channel data register address + 30000

Register Alias	Register	Read/	Size	Type	Unit	Description

	Starting Address (decimal)	Write				
Basic demand parameters						
DMDMethod	3000	R/WC	1	UInt16	-	Demand calculation method: 0 = sliding 1 = fixed
DMD block	3001	R/RC	1	UInt16	minute	Demand block
PDMD reset time	3002	R	4	Date time	-	Maximum demand reset date and time
Power demand						
PADemand	3020	R	2	Float32	kW	Phase A current active power demand
PAPeakDemand	3022	R	2	Float32	kW	Phase A active power maximum demand
PAPeakDemandDate	3024	R	4	Date time	-	Occurrence time of phase A active power maximum demand
PBDemand	3028	R	2	Float32	kW	Phase B current active power demand
PBPeakDemand	3030	R	2	Float32	kW	Phase B active power maximum

						demand
PBPeakDemandDate	3032	R	4	Date time	-	Occurrence time of phase B active power maximum demand
PCDemand	3036	R	2	Float32	kW	Phase C current active power demand
PCPeakDemand	3038	R	2	Float32	kW	Phase C active power maximum demand
PCPeakDemandDate	3040	R	4	Date time	-	Occurrence time of phase C active power maximum demand
PSUMDemand	3044	R	2	Float32	kW	Current total active power demand
PSUMPeakDemand	3046	R	2	Float32	kW	Maximum demand of total active power
PSUMPeakDemandDate	3048	R	4	Date time	-	Occurrence time of total active power maximum demand
QADemand	3052	R	2	Float32	kVar	Phase A reactive power demand
QAPeakDemand	3054	R	2	Float32	kVar	Phase A reactive power maximum

						demand
QAPeakDemandDate	3056	R	4	Date time	-	Occurrence time of phase A reactive power maximum demand
QBDemand	3060	R	2	Float32	kVar	Phase B reactive power demand
QBPeakDemand	3062	R	2	Float32	kVar	Phase B reactive power maximum demand
QBPeakDemandDate	3064	R	4	Date time	-	Occurrence time of phase B reactive power maximum demand
QCDemand	3068	R	2	Float32	kVar	Phase C reactive power demand
QCPeakDemand	3070	R	2	Float32	kVar	Phase C reactive power maximum demand
QCPeakDemandDate	3072	R	4	Date time	-	Occurrence time of phase C reactive power maximum demand
QSUMDemand	3076	R	2	Float32	kVar	Current total reactive power demand

QSUMPeakDemand	3078	R	2	Float32	kVar	Maximum demand of total reactive power
QSUMPeakDemandDate	3080	R	4	Date time	-	Occurrence time of total reactive power maximum demand
SADemand	3084	R	2	Float32	kVa	Phase A apparent power demand
SAPeakDemand	3086	R	2	Float32	kVa	Phase A apparent power maximum demand
SAPeakDemandDate	3088	R	4	Date time	-	Occurrence time of phase A apparent power maximum demand
SB Demand	3092	R	2	Float32	kVa	Phase B apparent power demand
SBPeakDemand	3094	R	2	Float32	kVa	Phase B apparent power maximum demand
SBPeakDemandDate	3096	R	4	Date time	-	Occurrence time of phase B apparent power

						maximum demand
SCDemand	3100	R	2	Float32	kVa	Phase C apparent power demand
SCPeakDemand	3102	R	2	Float32	kVa	Phase C apparent power maximum demand
SCPeakDemandDate	3104	R	4	Date time	-	Occurrence time of phase C apparent power maximum demand
SSUMDemand	3108	R	2	Float32	kVa	Current total apparent power demand
SSUMPeakDemand	3110	R	2	Float32	kVa	Maximum demand of total apparent power
SSUMPeakDemandDate	3112	R	4	Date time	-	Total apparent power maximum demand occurrence time

3.23 Voltage and Current Harmonics

List register address is X1 channel data

X2 channel data register address = X1 channel data register address + 10000

X3 channel data register address = X1 channel data register address + 20000

X4 channel data register address = X1 channel data register address + 30000

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
Current harmonic percentage						
IATHD	4000	R	2	Float32	%	Phase A current total harmonic percentage
IBTHD	4002	R	2	Float32	%	Phase B current total harmonic percentage
ICTHD	4004	R	2	Float32	%	Phase C current total harmonic percentage
IATOHD	4006	R	2	Float32	%	Phase A current odd total harmonics percentage
IBTOHD	4008	R	2	Float32	%	Phase B current odd total harmonics percentage
ICTOHD	4010	R	2	Float32	%	Phase C current odd total harmonics percentage
IATEHD	4012	R	2	Float32	%	Phase A current even total harmonics percentage
IBTEHD	4014	R	2	Float32	%	Phase B current even total harmonics percentage
ICTEHD	4016	R	2	Float32	%	Phase C current even total harmonics percentage

IAHD1	4018	R	2	Float32	%	Phase A current 1st harmonic percentage
IBHD1	4020	R	2	Float32	%	Phase B current 1st harmonic percentage
ICHD1	4022	R	2	Float32	%	Phase C current 1st harmonic percentage
…	4024-4311	…	…	…	…	ABC phase current 2nd-49th harmonic percentage
IAHD50	4312	R	2	Float32	%	Phase A current 50th harmonic percentage
IBHD50	4314	R	2	Float32	%	Phase B current 50th harmonic percentage
ICHD50	4316	R	2	Float32	%	Phase C current 50th harmonic percentage
Current harmonic value						
IAHDV1	4400	R	2	Float32	A	Phase A current fundamental current value
IBHDV1	4402	R	2	Float32	A	Phase B current fundamental current value
ICHDV1	4404	R	2	Float32	A	Phase C current fundamental current value
…	4406-4693	…	…	…	…	ABC phase current 2nd-49th harmonic current value
IAHDV50	4694	R	2	Float32	A	50th harmonic current

						value of phase A current
IBHDV50	4696	R	2	Float32	A	50th harmonic current value of phase B current
ICHDV50	4698	R	2	Float32	A	50th harmonic current value of phase C current
Voltage harmonic percentage						
UATHD	5000	R	2	Float32	%	Phase A voltage total harmonic percentage
UBTHD	5002	R	2	Float32	%	Phase B voltage total harmonic percentage
UCTHD	5004	R	2	Float32	%	Phase C voltage total harmonic percentage
UATOHD	5006	R	2	Float32	%	Phase A voltage odd total harmonics percentage
UBTOHD	5008	R	2	Float32	%	Phase B voltage odd total harmonics percentage
UCTOHD	5010	R	2	Float32	%	Phase C voltage odd total harmonics percentage
UATEHD	5012	R	2	Float32	%	Phase A voltage even total harmonics percentage
UBTEHD	5014	R	2	Float32	%	Phase B voltage even total harmonics percentage

UCTEHD	5016	R	2	Float32	%	Phase C voltage even total harmonics percentage
UAHD1	5018	R	2	Float32	%	Phase A voltage 1st harmonic percentage
UBHD1	5020	R	2	Float32	%	Phase B voltage 1st harmonic percentage
UCHD1	5022	R	2	Float32	%	Phase C voltage 1st harmonic percentage
…	5024-5311	…	…	…	…	ABC phase voltage 2nd-49th harmonic percentage
UAHD50	5312	R	2	Float32	%	Phase A voltage 50th harmonic percentage
UBHD50	5314	R	2	Float32	%	Phase B voltage 50th harmonic percentage
UCHD50	5316	R	2	Float32	%	Phase C voltage 50th harmonic percentage
Voltage harmonic value						
UAHDV1	5400	R	2	Float32	V	Phase A voltage 1st harmonic voltage value
UBHDV1	5402	R	2	Float32	V	Phase B voltage 1st harmonic voltage value
UCHDV1	5404	R	2	Float32	V	Phase C voltage 1st harmonic voltage value
…	5406-5693	…	…	…	…	ABC phase voltage 2nd-49th harmonic voltage value
UAHDV50	5694	R	2	Float32	V	50th harmonic voltage

						value of phase A voltage
UBHDV50	5696	R	2	Float32	V	50th harmonic voltage value of phase B voltage
UCHDV50	5698	R	2	Float32	V	50th harmonic voltage value of phase C voltage

3.24 Maximum and Minimum Values

List register address is X1 channel data

X2 channel data register address = X1 channel data register address + 10000

X3 channel data register address = X1 channel data register address + 20000

X4 channel data register address = X1 channel data register address + 30000

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
Current maximum/minimum						
IA Max	6000	R	2	Float32	A	Maximum current of phase A
IB Max	6002	R	2	Float32	A	Maximum current of phase B
IC Max	6004	R	2	Float32	A	Maximum current of phase C
IAVG Max	6006	R	2	Float32	A	Maximum three-phase average current

IN Max	6008	R	2	Float32	A	Maximum current of phase N
IA Min	6010	R	2	Float32	A	Minimum current of phase A
IB Min	6012	R	2	Float32	A	Minimum current of phase B
IC Min	6014	R	2	Float32	A	Minimum current of phase C
IAVGMin	6016	R	2	Float32	A	Minimum three-phase average current
IN Min	6018	R	2	Float32	A	Minimum current of phase N
Voltage maximum/minimum						
UA Max	6020	R	2	Float32	V	Maximum UA-UN phase voltage
UB Max	6022	R	2	Float32	V	Maximum UB-UN phase voltage
UC Max	6024	R	2	Float32	V	Maximum UC-UN phase voltage
Phase UAVGMax	6026	R	2	Float32	V	The maximum value of the average value of the three-phase voltage
UA Min	6030	R	2	Float32	V	Minimum UA-UN phase voltage
UB Min	6032	R	2	Float32	V	Minimum UB-UN phase voltage
UC Min	6034	R	2	Float32	V	Minimum UC-UN

						phase voltage
UAVGMin	6036	R	2	Float32	V	Minimum value of the average value of the three-phase voltage
UAB Max	6040	R	2	Float32	V	Maximum UA-UB line voltage
UBC Max	6042	R	2	Float32	V	Maximum UB-UC line voltage
UCA Max	6044	R	2	Float32	V	Maximum UC-UA line voltage
LineUAVG Max	6046	R	2	Float32	V	The maximum value of the average value of the three-phase line voltage
UAB Min	6050	R	2	Float32	V	Minimum UA-UB line voltage
UBC Min	6052	R	2	Float32	V	Minimum UB-UC line voltage
UCA Min	6054	R	2	Float32	V	Minimum UC-UA line voltage
LineUAVG Min	6056	R	2	Float32	V	Minimum value of the average value of the three-phase line voltage
Active power maximum/minimum						
PA Max	6060	R	2	Float32	kW	Maximum active power of phase A
PB Max	6062	R	2	Float32	kW	Maximum active

						power of phase B
PC Max	6064	R	2	Float32	kW	Maximum active power of phase C
PSUMMax	6066	R	2	Float32	kW	Maximum three-phase total active power
PA Min	6070	R	2	Float32	kW	Minimum active power of phase A
PB Min	6072	R	2	Float32	kW	Minimum active power of phase B
PC Min	6074	R	2	Float32	kW	Minimum active power of phase C
PSUMMin	6076	R	2	Float32	kW	Minimum three-phase total active power
Reactive power maximum/minimum						
QA Max	6080	R	2	Float32	kVar	Maximum reactive power of phase A
QB Max	6082	R	2	Float32	kVar	Maximum reactive power of phase B
QC Max	6084	R	2	Float32	kVar	Maximum reactive power of phase C
QSUMMax	6086	R	2	Float32	kVar	Maximum three-phase total reactive power
QA Min	6090	R	2	Float32	kVar	Minimum reactive power of phase A
QB Min	6092	R	2	Float32	kVar	Minimum reactive power of phase B

QC Min	6094	R	2	Float32	kVar	Minimum reactive power of phase C
QSUMMin	6096	R	2	Float32	kVar	Minimum three-phase total reactive power
Apparent power maximum/minimum						
SA Max	6100	R	2	Float32	kVa	Maximum apparent power of phase A
SB Max	6102	R	2	Float32	kVa	Maximum apparent power of phase B
SC Max	6104	R	2	Float32	kVa	Maximum apparent power of phase C
SSUMMax	6106	R	2	Float32	kVa	Maximum three-phase total apparent power
SA Min	6110	R	2	Float32	kVa	Minimum apparent power of phase A
SB Min	6112	R	2	Float32	kVa	Minimum apparent power of phase B
SC Min	6114	R	2	Float32	kVa	Minimum apparent power of phase C
SSUMMin	6116	R	2	Float32	kVa	Minimum three-phase total apparent power

3.25 Imbalance

List register address is X1 channel data

X2 channel data register address = X1 channel data register address + 10000

X3 channel data register address = X1 channel data register address + 20000

X4 channel data register address = X1 channel data register address + 30000

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
Current negative sequence imbalance	7000	R	2	Float32	%	Current negative sequence imbalance
Current zero-sequence imbalance	7002	R	2	Float32	%	Current zero-sequence imbalance
Voltage negative sequence imbalance	7004	R	2	Float32	%	Voltage negative sequence imbalance
Voltage zero-sequence imbalance	7006	R	2	Float32	%	Voltage zero-sequence imbalance

3.26 Current K Factor

List register address is X1 channel data

X2 channel data register address = X1 channel data register address + 10000

X3 channel data register address = X1 channel data register address + 20000

X4 channel data register address = X1 channel data register address + 30000

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
KFIA	8000	R	2	Float32	-	A phase current

						K factor
KFIB	8002	R	2	Float32	-	B phase current K coefficient
KFIC	8004	R	2	Float32	-	C phase current K coefficient

3.27 Voltage and Current Angle

List register address is X1 channel data

X2 channel data register address = X1 channel data register address + 10000

X3 channel data register address = X1 channel data register address + 20000

X4 channel data register address = X1 channel data register address + 30000

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
Voltage angle: Taking phase A voltage as a reference, it is the leading phase A voltage angle						
UA	8100	R	2	Float32	°	Phase A voltage angle
UB	8102	R	2	Float32	°	Phase B voltage angle
UC	8104	R	2	Float32	°	Phase C voltage angle
Current angle: Taking phase A current as reference, it is the leading phase A current angle						
IA	8106	R	2	Float32	°	Phase A current angle
IB	8108	R	2	Float32	°	Phase B current angle
IC	8110	R	2	Float32	°	Phase C current angle
Angle between voltage and current:						

UIA	8112	R	2	Float32	°	Angle between phase A voltage and current
UIB	8114	R	2	Float32	°	Angle between phase B voltage and current
UIC	8116	R	2	Float32	°	Angle between phase C voltage and current

3.28 Alarm

List register address is X1 channel data

X2 channel data register address = X1 channel data register address + 10000

X3 channel data register address = X1 channel data register address + 20000

X4 channel data register address = X1 channel data register address + 30000

Register Alias	Register Starting Address (decimal)	Read/Write	Size	Type	Unit	Description
Alarm bitmap						
Enabled alarm bitmap						
Enable alarm bitmap 1	9000	R	1	Bitmap	-	0 = Alarm disabled 1=Alarm enabled Bit N (0,15) = Alarm ID N (1-16)
Enable alarm bitmap 2	9001	R	1	Bitmap	-	0 = Alarm disabled 1=Alarm enabled Bit N (0,15) = Alarm ID N (17-32)
Active alarm bitmap						
Activate alarm bitmap 1	9010	R	1	Bitmap	-	0 = Alarm not active 1 = Alarm active Bit N (0,15) = Alarm ID N (1-16)

Activate alarm bitmap 2	9011	R	1	Bitmap	-	0 = Alarm not active 1 = Alarm active Bit N (0,15) = Alarm ID N (17-32)
Activate alarm bitmap 1	9010	R	1	Bitmap	-	0 = Alarm not active 1 = Alarm active Bit N (0,15) = Alarm ID N (1-16)
Current alarm output bit (Note : There is at most 1 alarm output at the same time)						
Current alarm output bitmap 1	9020	R	1	Bitmap	-	0=Alarm not output 1=Alarm output Bit N (0,15) = Alarm ID N (1-16)
Current alarm output bitmap 2	9021	R	1	Bitmap	-	0=Alarm not output 1=Alarm output Bit N (0,15) = Alarm ID N (17-32)
Alarm parameters						
Overcurrent, each phase **(Note: If one phase exceeds the activation threshold, an alarm will be generated. If all phases are below the alarm release point, the alarm will be released.)**						**Alarm ID =1**
Enabled status	9100	R / WC	1	UInt16	-	Enabled status 0 = Disable 1 = Enable
Activation threshold	9102	R / WC	2	Float32	A	Alarm activation threshold
Alarm release point	9104	R / WC	2	Float32	%	Alarm release point Percent error relative to the alarm activation threshold *For example:* *Alarm activation threshold = 100A* *Alarm release point = 5%* *the current value is less than 100,100 *5%=95A , the alarm is released.*
Buzzer output association	9106	R / WC	1	UInt16	-	Buzzer output association 0 = No association 1 = Associated
Relay output association	9107	R / WC	1	UInt16	-	Relay output association 0 = No association 1 = Associated (Note: The control is only valid when the relay output mode is alarm output mode)
Undercurrent, each phase						**Alarm ID = 2**
Enabled status	9120	R / WC	1	UInt16	-	Enabled status 0 = Disable 1 = Enable

Activation threshold	9122	R / WC	2	Float32	A	Alarm activation threshold
Alarm release point	9124	R / WC	2	Float32	%	Alarm release point Percent error relative to the alarm activation threshold
Buzzer output association	9126	R / WC	1	UInt16	-	Buzzer output association 0 = No association 1 = associated
Relay output association	9127	R / WC	1	UInt16	-	Relay output association 0 = No association 1 = associated
Over-phase voltage, LN						**Alarm ID =3**
Enabled status	9140	R / WC	1	UInt16	-	Enabled status 0 = Disable 1=Enable
Activation threshold	9142	R / WC	2	Float32	V	Alarm activation threshold
Alarm release point	9144	R / WC	2	Float32	%	Alarm release point Percent error relative to the alarm activation threshold
Buzzer output association	9146	R / WC	1	UInt16	-	Buzzer output association 0 = No association 1 = Associated
Relay output association	9147	R / WC	1	UInt16	-	Relay output association 0 = No association 1 = Associated
Loss of phase voltage, LN						**Alarm ID =4**
Enabled status	9160	R / WC	1	UInt16	-	Enabled status 0 = Disable 1=Enable
Activation threshold	9162	R / WC	2	Float32	V	Alarm activation threshold
Alarm release point	9164	R / WC	2	Float32	%	Alarm release point Percent error relative to the alarm activation threshold
Buzzer output association	9166	R / WC	1	UInt16	-	Buzzer output association 0 = No association 1 = Associated
Relay output association	9167	R / WC	1	UInt16	-	Relay output association 0 = No association 1 = Associated
Line voltage, L -L						**Alarm ID =5**
Enabled status	9180	R / WC	1	UInt16	-	Enabled status 0 = Disable 1=Enable
Activation threshold	9182	R / WC	2	Float32	V	Alarm activation threshold

Alarm release point	9184	R / WC	2	Float32	%	Alarm release point Percent error relative to the alarm activation threshold
Buzzer output association	9186	R / WC	1	UInt16	-	Buzzer output association 0 = No association 1 = Associated
Relay output association	9187	R / WC	1	UInt16	-	Relay output association 0 = No association 1 = Associated
Line-to-line voltage, L -L						**Alarm ID = 6**
Enabled status	9200	R / WC	1	UInt16	-	Enabled status 0 = Disable 1=Enable
Activation threshold	9202	R / WC	2	Float32	V	Alarm activation threshold
Alarm release point	9204	R / WC	2	Float32	%	Alarm release point Percent error relative to the alarm activation threshold
Buzzer output association	9206	R / WC	1	UInt16	-	Buzzer output association 0 = No association 1 = Associated
Relay output association	9207	R / WC	1	UInt16	-	Relay output association 0 = No association 1 = Associated
Overpower, total active power (absolute value)						**Alarm ID = 10**
Enabled status	9220	R / WC	1	UInt16	-	Enabled status 0 = Disable 1=Enable
Activation threshold	9222	R / WC	2	Float32	kW	Alarm activation threshold
Alarm release point	9224	R / WC	2	Float32	%	Alarm release point Percent error relative to the alarm activation threshold
Buzzer output association	9226	R / WC	1	UInt16	-	Buzzer output association 0 = No association 1 = Associated
Relay output association	9227	R / WC	1	UInt16	-	Relay output association 0 = No association 1 = Associated
Overpower, total reactive power (absolute value)						**Alarm ID =1 4**
Enabled status	9 240	R / WC	1	UInt16	-	Enabled status 0 = Disable 1=Enable
Activation threshold	9 242	R / WC	2	Float32	kVar	Alarm activation threshold
Alarm release point	9 244	R / WC	2	Float32	%	Alarm release point Percent error relative to the alarm activation threshold

Buzzer output association	9 246	R / WC	1	UInt16	-	Buzzer output association 0 = No association 1 = Associated
Relay output association	9 247	R / WC	1	UInt16	-	Relay output association 0 = No association 1 = Associated
Overpower, total apparent						**Alarm ID =18**
Enabled status	9260	R / WC	1	UInt16	-	Enabled status 0 = Disable 1=Enable
Activation threshold	9262	R / WC	2	Float32	kVA	Alarm activation threshold
Alarm release point	9264	R / WC	2	Float32	%	Alarm release point Percent error relative to the alarm activation threshold
Buzzer output association	9266	R / WC	1	UInt16	-	Buzzer output association 0 = No association 1 = Associated
Relay output association	9267	R / WC	1	UInt16	-	Relay output association 0 = No association 1 = Associated
Over demand, total active power (absolute value), current						**Alarm ID = 20**
Enabled status	9280	R / WC	1	UInt16	-	Enabled status 0 = Disable 1=Enable
Activation threshold	9282	R / WC	2	Float32	kW	Alarm activation threshold
Alarm release point	9284	R / WC	2	Float32	%	Alarm release point Percent error relative to the alarm activation threshold
Buzzer output association	9286	R / WC	1	UInt16	-	Buzzer output association 0 = No association 1 = Associated
Relay output association	9287	R / WC	1	UInt16	-	Relay output association 0 = No association 1 = Associated
Over demand, total reactive power (absolute value), current						**Alarm ID = 21**
Enabled status	9 300	R / WC	1	UInt16	-	Enabled status 0 = Disable 1=Enable
Activation threshold	9 302	R / WC	2	Float32	kVar	Alarm activation threshold
Alarm release point	9 304	R / WC	2	Float32	%	Alarm release point Percent error relative to the alarm activation threshold
Buzzer output association	9 306	R / WC	1	UInt16	-	Buzzer output association 0 = No association 1 = Associated

Relay output association	9 307	R / WC	1	UInt16	-	Relay output association 0 = No association 1 = Associated
Over demand, total apparent, current						**Alarm ID = 22**
Enabled status	9320	R / WC	1	UInt16	-	Enabled status 0 = Disable 1=Enable
Activation threshold	9322	R / WC	2	Float32	kVA	Alarm activation threshold
Alarm release point	9324	R / WC	2	Float32	%	Alarm release point Percent error relative to the alarm activation threshold
Buzzer output association	9326	R / WC	1	UInt16	-	Buzzer output association 0 = No association 1 = Associated
Relay output association	9327	R / WC	1	UInt16	-	Relay output association 0 = No association 1 = Associated
Over THD-U (voltage total harmonics) , each phase						**Alarm ID = 30**
Enabled status	9340	R / WC	1	UInt16	-	Enabled status 0 = Disable 1=Enable
Activation threshold	9342	R / WC	2	Float32	%	Alarm activation threshold
Alarm release point	9344	R / WC	2	Float32	%	Alarm release point Percent error relative to the alarm activation threshold
Buzzer output association	9346	R / WC	1	UInt16	-	Buzzer output association 0 = No association 1 = Associated
Relay output association	9347	R / WC	1	UInt16	-	Relay output association 0 = No association 1 = Associated
Through THD-I (total current harmonics) , each phase						**Alarm ID = 31**
Enabled status	9 360	R / WC	1	UInt16	-	Enabled status 0 = Disable 1=Enable
Activation threshold	9 362	R / WC	2	Float32	%	Alarm activation threshold
Alarm release point	9 364	R / WC	2	Float32	%	Alarm release point Percent error relative to the alarm activation threshold
Buzzer output association	9 366	R / WC	1	UInt16	-	Buzzer output association 0 = No association 1 = Associated
Relay output association	9 367	R / WC	1	UInt16	-	Relay output association 0 = No association 1 = Associated

4 Version Revision History

Version	Description	Date	Modified by
v1.0	First edition	2024/9/19	wynn