Power & Energy metering

ENERCLIP SERIES

MULTI-CIRCUIT MONITORING SYSTEM

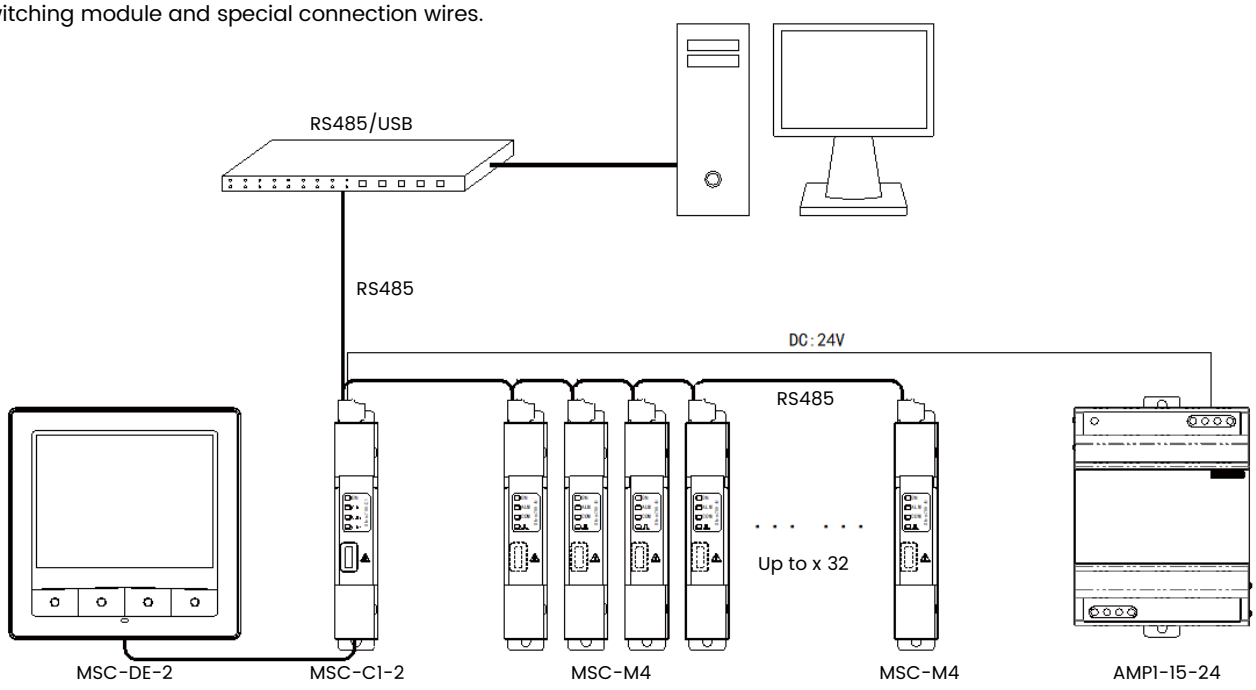
lettel

MSC-M4 measurement modules

Modbus RTU communication protocol

Introduction

Enerclip V2 is composed of one display module MSC-DE-2, one communication module MSC-C1-2, one power supply module AMP1-15-24, 32 measurement modules MSC-M4 (extensible to module MSC-MEx) at most, current transformer, switching module and special connection wires.



Component		Quantity
Name	Model	
Display module	MSC-DE-2	1
Communication module	MSC-C1-2	1
Measurement module	MSC-M4	1～32
Temperature module	MSC-ME0	1～32
Temperature & switch module	MSC-ME1	1～32
Temperature &leakage module	MSC-ME2	1～32
Switch module	MSC-ME3	1～32
Temperature &relay module	MSC-ME4	1～32
Temperature&switch &leakage module	MSC-ME8	1～32
Power supply module	AMP1-15-24	1

Communication

2.1 Physical layer

The communication interface of MSC-M4 should be connected by shielded twisted pair. A bus can connect 32 devices at most, and terminal resistance should be connected at both ends of the bus. Communication speed range is 1200～9600bps，defaulted as 9600bps; Byte format is 1 start bit, 8 data bits, no check bit or 1 odd/even check bit, and 1/2 stop bit.

2.2 Communication Protocol

Data format

Address code	Function code	Data code	CRC check code
one byte	one byte	N bytes	two bytes

Address code: 1~247 are used and other addresses are reserved.

Function code: It tells the addressed terminal device to perform a function. The following list shows the function codes supported by the device as well as corresponding meaning and functions.

Function code	**Meaning**
0x01	Read the status of relay output
0x02	Read the status of digital input
0x03/0x04	Read the value of data register
0x05	Remotely control the action of single relay
0x0F	Remotely control the action of muli-relay
0x10	Write register instruction
0x14	Read event recording

Data code: It includes the data which is needed by a terminal device when it performs a function, or the data collected from a terminal device when it responds to an inquiry. These data may be numbers, referenced address or setting value. For example, when the data code tells a terminal device to read a register, the data field should indicate the terminal device that which register it should begin from and how much data it should read. The data code sent back from a terminal device includes data length and corresponding data.

Check code: Cyclical Redundancy Check (CRC16) field occupies two bytes including a 16-bit binary value. CRC value will be calculated by transmission equipment and be added to a data frame. When the receiving equipment receives the data, it will calculate CRC value again, then it compares the two CRC value. If the two value are not equal, an error will be detected.

2.3 Message format instruction

2.3.1 Read the status of relay output（Function code 0x01）

Host request	Frame structure	Address code	Function code	data code		CRC check code
				initial relay address	Number of relay	
	Byte	1 byte	1 byte	2 bytes	2 bytes	2 bytes
	Data range	1～247	0x01	0x0000（fixed）	0x0001～0x0002	CRC16
	Message example	0x01	0x01	0x00 0x00	0x00 0x02	0xBD 0xCB
slave response	frame structure	address code	function code	data code		CRC check code
				byte of register	register value	
	Byte	1 byte	1 byte	1 byte	1 byte	2 bytes
	Message example	0x01	0x01	0x01	0x03	0x11 0x89

Remark: the register value in the slave response indicates the status of the relay. Beginning from the lowest bit of the byte, each number corresponds to the status of a loop of relay output. "1" indicates the relay is closed, while "0" indicates the relay is cut off. In the upper list, the register value "0x03" corresponds to "0000 0011" in binary system which means the first and second loop of relays are closed.

2.3.2 Read the status of digital input（Function code 0x02）

Host request	Frame structure	address code	function code	data code		CRC check code
				initial switch address	number of switches	
	Byte	1 byte	1 byte	2 bytes	2 bytes	2 bytes
	Data range	1～247	0x02	0x0000	0x0001～0x000C	CRC16
	Message example	0x01	0x02	0x00 0x00	0x00 0x04	0x79 0xC9
Slave response	Data structure	address data	function code	data code		CRC check code
				byte of register	register value	
	Byte	1 byte	1 byte	1 byte	1 byte	2 bytes
	Message example	0x01	0x02	0x01	0x02	0x20 0x49

Remark: the register value in the slave response indicates the status of digital input. Beginning from the lowest bit of the byte, each number corresponds to the status of a loop of digital input. "1" indicates the switch is closed, while "0" indicates the switch is cut off. In the upper list the register value "0x02" is "0000 0010" in binary system which means second loop of digital input is closed.

2.3.3 Read data register value（function code 0x03/0x04）

Host request	Frame structure	address code	function code	data code		CRC check code
				initial register address	number of register	
	Byte	1 byte	1 byte	2 bytes	2 bytes	2 bytes
	data range	1～247	0x03/ 0x04		Max 100	CRC16
	message example	0x01	0x03	0x00 0x06	0x00 0x06	0XE4 0x36
slave response	frame structure	address code	function code	data code		CRC check code
				byte of register	register value	
	byte	1 byte	1 byte	1 byte	12 bytes	2 bytes
	message example	0x01	0x03	0x0C	（12-byte data）	（CRC16）

Remark: the initial register address in host inquiry is the initial address of the data collected from primary grid or secondary grid. The number of register indicates the length of the data. In the upper list the register address "0x00 0x06" indicates the initial address of phase voltage float data of three phases, and the number of register "0x00 0x06" indicates the length of the data is six words (three float data occupy six registers).

2.3.4 Remotely-controlled single relay output（function code 0x05）

host request	frame structure	address code	function code	data code		CRC check code
				initial relay address	relay action value	
	byte	1byte	1byte	2 bytes	2 bytes	2 bytes
	data range	1～247	0x05	0x0000～0x0003	0xFF00/0x0000	CRC16
	message example	0x01	0x05	0x00 0x00	0xFF 0x00	0x8C 0x3A
slave response	frame structure	address code	function code	data code		CRC check code
				initial relay address	relay action value	
	byte	1 byte	1 byte	2 bytes	2 bytes	2 bytes
	message example	0x01	0x05	0x00 0x00	0xFF 0x00	0x8C 0x3A

Remark: in host request, the relay action value "0xFF00" indicates the relay is closed, while "0x0000" indicates the relay is cut off. If you want to perform remotely control, please make sure the relay is working in "remotely control" mode.

2.3.5 Remotely-controlled multi-relay output（function code 0x0F）

				data code				CRC check code
host request	frame structure	address code	function code	initial relay address	number of relay	number of data byte	relay action value	
	byte	1 byte	1 byte	2 bytes	2 bytes	1 byte	1 byte	2 bytes
	data range	1～247	0x0F	0x0000	0x0001～0x0004	0x01		CRC16
	message example	0x01	0x0F	0x00 0x00	0x00 0x02	0x01	0x03	0x9E 0x96
slave response	frame structure	address code	function code	data code				CRC check code
				initial relay address		number of relay		
	byte	1 byte	1byte	2bytes		2bytes		2 bytes
	message example	0x01	0x0F	0x00 0x00		0x00 0x02		0xD4 0x0A

Remark: in the host inquiry, beginning from the lowest bit of relay action value, each bit corresponds to a loop of relay output. "1" indicates the relay is closed, while "0" indicates the relay is cut off. In the upper list, relay action value "0x03"is "0000 0011"in binary system, which means the first and second loops of relay are closed.

2.3.6 Write setup register (function code 0x10)

	Frame structure	Address code	Function code	Data code				Check code
Host request				initial relay address	number of relay	number of data byte	Write value	
	Bytes	1 byte	1 byte	2 bytes	2 bytes	1 byte	2N bytes	2 bytes
	Data range	1～247	0x10	0x080A	0x0001	N		CRC16
	Message example	0x01	0x10	0x08 0x0A	0x00 0x01	0x02	0x0064	0x2ED1
Slave response	Frame structure	Address code	Function code	Data code				Check code
				Register initial address	Register length			
	Bytes taken	1 byte	1 byte	2 bytes	2 bytes			2 bytes
	Message example	0x01	0x10	0x08 0x0A	0x00 0x01			0x2ED1

Remark: Please follow strictly the address list of instrument setting information in the annex of instrument when the setup register is written. Do not try to modify and areas which are kept used and the write data shall not exceed the setting range. Wrong writing of setup register may lead to abnormal instrument operation. Please be careful with the operation.

2.3.7 Read event recording (function code 0x14)

The event recording and data read are SOE event recording, over-voltage and under-voltage recording, over-current and under-current recording, overload and underload recording, voltage swell, dips, voltage interrupt recording.

Request

Function code	1 byte	0x14
Byte counting	1 byte	0x07
Sub-request x, parameter type	1 byte	0x06
Sub-request x, document No.	2 bytes	0x0000-0x0007
Sub-request x, recording No.	2 bytes	0x0000-0x0020
Sub-request x, recording length	2 bytes	N

Response

Function code	1 byte	0x14
Response data length	1 byte	0x07～0xF5
Sub-request x, relevant document length.	1 byte	0x06～0xF4
Sub-request x, reference type	1 byte	6
Sub-request x, recording data	N×2 bytes	...

Send the document No., recording No., and recording length description of sub-request of the message

Event recording	Document No.	Recording No.	Recording length
SOE event	0x0000	0x0000～0x001F 0: latest SOE event 1：last SOE event	1～8
Over voltage	0x0008	0x0000-0x0009: 0x0000: latest over voltage event recording 0x0001:last over voltage event recording ... 0x0009:last 9th over voltage event recording	
Under voltage	0x0009	Under voltage event recording, same to above	
Over current	0x000A	Over current event recording, same to above	
Under current	0x000B	Under current event recording, same to above	
Over load power	0x000C	Over load power event recording, same to above	
Under load power	0x000D	Under load power event recording, same to above	

2.3.8 Read SOE event recording:

Host request	Frame structure	Address code	Function code	Data code					Check code
				Byte counting	Parameter type	Document No.	Recording No.	Recording length	
	Bytes taken	1 byte	1 byte	1 byte	1 byte	2 bytes	2 bytes	2 bytes	2 bytes
	Data range	1～247	0x14	0x07	0x06	0x0000	0～31	1～8	CRC16
	Message example	0x01	0x14	0x07	0x06	0x0000	0x0000	0x0008	0xF8E2

Slave response	Frame structure	Address code	Function code	Data code				Check code
				Response data length	Document response length	Parameter type	Recording data	
	Bytes taken	1 byte	1 byte	1 byte	1 byte	1 byte	16 bytes	2 bytes
	Message example	0x01	0x14	0x12	0x11	0x06	SOE recording data	CRC16

SOE event recording

The instrument have 32 pieces of SOE event recording to record the digital input, time and status of relay output action. The resolution is 1ms.

Format description of SOE event recording data:

Year, month, day, hour, minute, second, millisecond(8byte) ①+ DI change status bits (2byte) + DI present status bits (2byte) + DO change status bits (2byte) + DO present status bits (2byte).

Year, month, day, hour, minute, second, millisecond：time when SOE event occurs.

DI change status bit: status bit which is changed corresponding to each channel of digital input starting from the lowest bit of the byte. 1 means action and 0 means no action.

DI present status bit: status value corresponding to each channel of digital input starting from the lowest bit of the byte. 1 means action status and 0 means reset status.

DO change status bit: status bit which is changed corresponding to each channel of relay output starting from the lowest bit of the byte. 1 means action and 0 means no action.

DO present status bit: status value corresponding to each channel of relay output starting from the lowest bit of the byte. 1 means action status and 0 means reset status.

For example: 0E 03 05 08 14 01 01 00 00 02 00 03 00 01 00 00

0E 03 05 08 14 01 01 00 means the time of 2014, March, 5th, 8 o'clock, 20 minutes, 1 second, 256 millisecond.

00 02 00 03：

00 02 means that the digital input status of the second channel is changed while other channels remain

unchanged;
00 03 means the first channel and the second channel of digital input are in action status.

00 01 00 00:
00 01 means the status of first channel relay is changed;
00 00 means the current relay is in reset status.

Read over voltage event recording:

Host request	Frame structure	Address code	Function code	Data code					Check code
				Byte counting	Parameter type	Document No.	Recording No.	Recording length	
	Byte	1 byte	1 byte	1 byte	1 byte	2 bytes	2 bytes	2 bytes	2 bytes
	Data range	1～247	0x14	0x07	0x06	0x0008	0～BF	12	CRC16
	Message example	0x01	0x14	0x07	0x06	0x0003	0x0000	0x000C	0xBD21

Slave response	Frame structure	Address code	Function code	Data code				Check code
				Response data length	Document response length	Parameter type	Recording data	
	Byte	1 byte	1 byte	1 byte	1 byte	1 byte	24 bytes	2 bytes
	Message example	0x01	0x14	0x14	0x13	0x06	过压记录	CRC16

Over voltage, under voltage, over current, under current, over load power and under load power recording

The instrument has voltage over voltage and under voltage, current over current and under voltage, and power overload and under load records, with a maximum of 192 records. Voltage, current, and power judgment processing is performed every 250ms. Record the start and end times of the event, as well as the corresponding voltage, current, or power extremes throughout the entire event process. The thresholds and hysteresis of voltage, current, and power are set through communication.
Data format:
Year/month/day/hour/minute/second(start time)(6byte) + year/month/day / hour/ minute/second(end time)(6byte)+voltage limit value(12byte,Floating point data)
For example：0x0E 0x03 0x05 0x08 0x14 0x01　0x0E 0x03 0x05 0x08 0x14 0x01 0x43 0xE4 0x0F 0x5C 0x43 0xE4 0x19 0x9A 0x43 0xE4 0x17 0x0A

0x0E 0x03 0x05 0x08 0x14 0x01:
Start time: 14(year)3(month)5(day)8(hour)20(minute)1(second)
0x0E 0x03 0x05 0x08 0x14 0x05：
End time: 14(year)3(month)5(day)8(hour)20(minute)5(second)
0x43 0xE4 0x0F 0x5C: Voltage extreme value 456.12V,
0x43 0xE4 0x19 0x9A: Voltage extreme value 456.2V,

0x43 0xE4 0x17 0x0A: Voltage extreme value 456.18V,

For over voltage event recording, this value is the maximum voltage during the over voltage process (three-phase four wire is the phase voltage, three-phase three phase is the line voltage); For under voltage recording, this value is the minimum voltage during the under voltage process.

2.3 Data format

2.3.1 32-bit floating format

32-bit floating format conforms to IEEE-754 format. The byte order of the data is in the form of a large end sequence, the high byte is preceded, and the low byte is in the post.

The following table shows the Float data for three-phase voltage:

Address(Hex)	Data(Hex)	Description
0006-0007	435C-8000	V1 = 0x435C8000 = 220.5V
0008-0009	4360-4CCD	V2 = 0x43604CCD = 224.3V
000A-000B	435E-B333	V3 = 0x435EB333 = 222.7V

2.3.2 16-bit Int format

16-bit Integral format data adopts complementary code storage. The byte order of the data is in the form of a large end sequence, the high byte is preceded, and the low byte is in the post.

The following table shows the Int data for three-phase voltage:

Address(Hex)	Data(Hex)	Description
0210	0230	THDv1 = 0x0230 = 5.6%
0211	0172	THDv2 = 0x0172 = 3.7%
0212	0096	THDv3 = 0x0096 = 1.5%

2.3.3 32-bit Integral format

32-bit Integral format data adopts complementary code storage. The byte order of the data is in the form of a large end sequence, the high byte is preceded, and the low byte is in the post.

The following table shows the Long data for three-phase voltage:

Address(Hex)	Data(Hex)	Description
0210	0230	THDv1 = 0x0230 = 5.6%
0211	0172	THDv2 = 0x0172 = 3.7%
0212	0096	THDv3 = 0x0096 = 1.5%

Appendix 1: MODBUS-RTU address sheet（0x03/0x04 Command data register address）

Primary electrical data

Address	Format	Data description	Unit	R/W
0000-0005	Reserved			
0006-0007	Float	Phase A voltage	V	R
0008-0009	Float	Phase B voltage	V	R
0010-0011	Float	Phase C voltage	V	R
0012-0013	Float	Line AB voltage	V	R
0014-0015	Float	Line BC voltage	V	R
0016-0017	Float	Line CA voltage	V	R
0018-0019	Float	Phase A current	A	R
0020-0021	Float	Phase B current	A	R
0022-0023	Float	Phase C current	A	R
0024-0025	Float	In current (reserved)	A	R
0026-0027	Float	Phase A active power	kW	R
0028-0029	Float	Phase B active power	kW	R
0030-0031	Float	Phase C active power	kW	R
0032-0033	Float	Total active power	kW	R
0034-0035	Float	Phase A reactive power	kvar	R
0036-0037	Float	Phase B reactive power	kvar	R
0038-0039	Float	Phase C reactive power	kvar	R
0040-0041	Float	Total reactive power	kvar	R
0042-0043	Float	Phase A apparent power	kVA	R
0044-0045	Float	Phase B apparent power	kVA	R
0046-0047	Float	Phase C apparent power	kVA	R
0048-0049	Float	Total apparent power	kVA	R
0050-0051	Float	Phase A power factor		R
0052-0053	Float	Phase B power factor		R
0054-0055	Float	Phase C power factor		R
0056-0057	Float	Total power factor		R
0058-0059	Float	Grid frequency	Hz	R
0060-0061	Float	EP+	kWh	R
0062-0063	Float	EP-	kWh	R
0064-0065	Float	EQ+	kvarh	R
0066-0067	Float	EQ-	kvarh	R
0068-0069	Float	Apparent energy	kVAh	R
0070-0071	Float	First quadrant reactive energy	kvarh	R
0072-0073	Float	Second quadrant reactive energy	kvarh	R
0074-0075	Float	Third quadrant reactive energy	kvarh	R
0076-0077	Float	Fourth quadrant reactive energy	kvarh	R
0078-0079	Float	Import fundamental wave active energy	kWh	R
0080-0081	Float	Export fundamental wave active energy	kWh	R
0082-0083	Float	Import fundamental wave reactive energy	kvarh	R
0084-0085	Float	Export fundamental wave reactive energy	kvarh	R

0086-0087	Float	Phase A import active energy	kWh	R
0088-0089	Float	Phase B import active energy	kWh	R
0090-0091	Float	Phase C import active energy	kWh	R
0092-0093	Float	Phase A export active energy	kWh	R
0094-0095	Float	Phase B export active energy	kWh	R
0096-0097	Float	Phase C export active energy	kWh	R
0098-0099	Float	Phase A import reactive energy	kvarh	R
0100-0101	Float	Phase B import reactive energy	kvarh	R
0102-0103	Float	Phase C import reactive energy	kvarh	R
0104-0105	Float	Phase A export reactive energy	kvarh	R
0106-0107	Float	Phase B export reactive energy	kvarh	R
0108-0109	Float	Phase C export reactive energy	kvarh	R
0110-0125	Reserved			

Module information

Address	Format	Data description	Unit	R/W
0126	Int	First temperature value	0.1℃	R
0127	Int	Second temperature value	0.1℃	R
0128	Int	Third temperature value	0.1℃	R
0129	Int	Fourth temperature value	0.1℃	R
0130	Int	First temperature value	0.1℃	R
0131	Int	Second temperature value	0.1℃	R
0132	Int	Third temperature value	0.1℃	R
0133	Int	Fourth temperature value	0.1℃	R
0134	Int	DI： Bit0: 1st DI status Bit1: 2nd DI status Bit2: 3rd DI status	0：open 1：close	R
0135	Int	First temperature value	0.1℃	R
0136	Int	Second temperature value	0.1℃	R
0137	Int	Third temperature value	0.1℃	R
0138	Int	Fourth temperature value	0.1℃	R
0139	Int	First road leakage	0.1mA	R
0140	Int	Second road leakage	0.1mA	R
0141	Int	Third road leakage	0.1mA	R
0142	Int	DI： Bit0: 1st DI status Bit1: 2nd DI status Bit2: 3rd DI status	0：open 1：close	R
0143	Int	First temperature value	0.1℃	R
0144	Int	Second temperature value	0.1℃	R
0145	Int	Third temperature value	0.1℃	R
0146	Int	Fourth temperature value	0.1℃	R
0147	Int	Relay output： Bit0：1st RO status	0：open 1：close	R

		Bit1：2nd RO status Bit2：3rd RO status Bit3：4th RO status		
0148	Int	First temperature value	0.1℃	R
0149	Int	Second temperature value	0.1℃	R
0150	Int	Third temperature value	0.1℃	R
0151	Int	Fourth temperature value	0.1℃	R
0152	Int	Current leakage	0.1mA	R
0153	Int	DI information	0：open 1：close	R
0154	Int	First temperature value	0.1℃	R
0155	Int	Second temperature value	0.1℃	R
0156	Int	Third temperature value	0.1℃	R
0157	Int	Fourth temperature value	0.1℃	R
0158	Int	Current leakage	0.1mA	R
0159	Int	DI information	0：open 1：close	R
0160	Int	RO information	0：open 1：close	R
0161	Int	Extension Module Type: Bit00: MSC-ME0 Bit01: MSC-ME1 Bit02: MSC-ME2 Bit03: MSC-ME3 Bit04: MSC-ME4 Bit05: reserved Bit06: reserved Bit07: reserved Bit08: MSC-ME8 Bit09: MSC-ME9	0：no 1：yes	R
0166-0169	Reserved			
0171-0229	Reserved			
0230	Int	First circuit leakage	0.1mA	R
0231	Int	Second circuit leakage	0.1mA	R
0232	Int	Third circuit leakage	0.1mA	R
0233	Int	First temperature	0.1℃	R
0234	Int	Second circuit temperature	0.1℃	R
0235	Int	Third circuit temperature	0.1℃	R
0236	Int	Fourth temperature	0.1℃	R
0237	Int	Extension module type	01: MSC-ME0 02: MSC-ME1 03: MSC-ME2 04: MSC-ME3 05: MSC-ME4 06: reserved	R

			07: MSC-ME6 08: reserved 09: MSC-ME8 10: MSC-ME9	
0238	char	High byte: year; low byte: month		R/W
0239	char	High byte: day; low byte: time		R/W
0240	char	High byte: minutes; low byte: seconds		R/W
0241	char	High byte: week; low byte: reserved		R/W
0242	Int	Relay output information: Bit 0:1st way relay output state (F4) Bit 1:2nd way relay output state (F4) Bit 2:3rd way Output state (F4) Bit 3:4th way relay output state (F4) Bit 4:5th way relay output state (M2x) Bit 5:6th way relay Output state (F9)	0：open 1：close	R
0243	Int	Switching input information: Bit0: 1st switch input status Bit1: 2nd switch input status Bit2: 3rd switch input status	0：open 1：close	R
0244	Int	System status: Bit00: High frequency alarm Bit01: Low frequency alarm Bit02: A-phase current high alarm Bit03: A-phase current low alarm Bit04: B-phase current high alarm Bit05: B-phase current low alarm Bit06: C-phase current high alarm Bit07: C-phase current low alarm Bit08: A-phase active power high alarm Bit09: A-phase active power low alarm Bit10: B phase active power high alarm Bit11: B-phase active power low alarm Bit12: C-phase active power high alarm Bit13: C-phase active power low alarm Bit14: Phase sequence alarm Bit15: Reserved	0：open 1：close	R
0245	Int	system mode: Bit 00: A-phase reactive power high alarm Bit 01: A-phase reactive power low alarm Bit 02: B-phase reactive power high alarm Bit 03: B-phase reactive power low alarm Bit 04: C-phase reactive power high alarm Bit 05: C-phase reactive power low alarm Bit 06: high temperature alarm in the first route Bit 07: First route of low temperature alarm Bit 08: high temperature alarm in the second	0：normal 1：abnormal	R

		road Bit 09: Low temperature alarm in the second route Bit 10: high temperature alarm in the third road Bit 11: Third road, low temperature alarm Bit 12: Fourth 4 high temperature alarm Bit 13: Fourth 4 low temperature alarm Bit 14: high total active power alarm Bit 15: Total active power is low for alarm		
0246	Int	system mode: Bit 00: the first road leakage high alarm Bit 01: the first circuit leakage low alarm Bit 02: the second road leakage high alarm Bit 03: Second road low leakage alarm Bit 04: the third road leakage high alarm Bit 05: the third road leakage low alarm Bit 06: A phase high voltage alarm Bit 07: A phase voltage low alarm Bit 08: Phase B high voltage alarm Bit 09: Phase B-voltage low alarm Bit 10: C phase high voltage alarm Bit 11: C phase voltage low alarm Bit 12: Total reactive power is high alarm Bit 13: Total reactive power No.1 alarm Bit 14-Bit 15: reserved	0：normal 1：abnormal	R
247	Int	Voltage open/close status information: Bit 0:1st switch switch state Bit 1: 2nd switch switch state Bit 2:3rd way switch switch state	0：open 1：close	R
248	Int	Bit00: Fifth road with high temperature alarm Bit01: Fifth road with low temperature alarm Bit02: Sixth road with high temperature alarm Bit03: Sixth road with low temperature alarm Bit04: Seventh road high temperature alarm Bit05: Seventh road low temperature alarm Bit06: Eighth road high temperature alarm Bit07: Eighth road low temperature alarm Bit08: Fourth road leakage high alarm Bit09: Fourth road leakage low alarm Bit10: Fifth road leakage high alarm Bit11: Fifth road leakage low alarm Bit12: Sixth road leakage high alarm Bit13: Sixth road leakage low alarm Bit14-Bit15: Reserved		
249-255	Reserved			

Max./min. value data

Address	Format	Data description	Unit	R/W
0256-0257	Float	Phase A voltage history maximum	V	R
0258-0259	Float	Phase B voltage history maximum	V	R
0260-0261	Float	Phase C voltage history maximum	V	R
0262-0263	Float	Max. historical data of Line AB voltage	V	R
0264-0265	Float	Max. historical data of Line BC voltage	V	R
0266-0267	Float	Max. historical data of Line CA voltage	V	R
0268-0269	Float	Max. historical data of Phase A current	A	R
0270-0271	Float	Max. historical data of Phase B current	A	R
0272-0273	Float	Max. historical data of Phase C current	A	R
0274-0275	Float	Max. historical data of In (3P4W)	A	R
0276-0277	Float	Max. historical data of total active power	kW	R
0278-0279	Float	Max. historical data of total reactive power	Kvar	R
0280-0281	Float	Max. historical data of total apparent power	kVA	R
0282-0283	Float	Max. historical data of total power factor		R
0284-0285	Float	Max. historical data of Frequency	Hz	R
0286-0287	Float	Min. historical data of Phase A voltage	V	R
0288-0289	Float	Min. historical data of Phase B voltage	V	R
0290-0291	Float	Min. historical data of Phase C voltage	V	R
0292-0293	Float	Min. historical data of Line AB voltage	V	R
0294-0295	Float	Min. historical data of Line BC voltage	V	R
0296-0297	Float	Min. historical data of Line CA voltage	V	R
0298-0299	Float	Min. historical data of Phase A current	A	R
0300-0301	Float	Min. historical data of Phase B current	A	R
0302-0303	Float	Min. historical data of Phase C current	A	R
0304-0305	Float	Min. historical data of In (3P4W)	A	R
0306-0307	Float	Min. historical data of total active power	kW	R
0308-0309	Float	Min. historical data of total reactive power	kvar	R
0310-0311	Float	Min. historical data of total apparent power	kVA	R
0312-0313	Float	Min. historical data of total power factor		R
0314-0315	Float	Min. historical data of frequency	Hz	R
0316-0375	Float	This month's historic extreme value		R
0376-0435	Float	Last month's historic extreme value		R
0436-0495	Float	Last 2 month's historical extreme value		R
0496-499	Reserved			

Tariff Energy

Address	Format	Data description	Unit	R/W
0500-0501	Float	Total overrate electric energy (total)	kWh	R
0502-0503	Float	Total compound rate electric energy (tip)	kWh	R
0504-0505	Float	Total overrate electric energy (peak)	kWh	R
0506-0507	Float	Total compound rate of electric energy (flat)	kWh	R
0508-0509	Float	Total compound rate energy (valley)	kWh	R
0510-0629	Float	Tariff energy of passed 12 months	kWh	R
0630-1023	Reserved			

Demand data

Address	Format	Data description	Unit	R/W
1024-1025	Float	Present demand of Phase A current	A	R
1026-1027	Float	Present demand of Phase B current	A	R
1028-1029	Float	Present demand of Phase C current	A	R
1030-1031	Float	Present demand of total active power	kW	R
1032-1033	Float	Present demand of total reactive power	kvar	R
1034-1035	Float	Present demand of total apparent power	kVA	R
1036-1037	Float	Demand of Phase A current in last cycle	A	R
1038-1039	Float	Demand of Phase B current in last cycle	A	R
1040-1041	Float	Demand of Phase C current in last cycle	A	R
1042-1043	Float	Demand of total active power in last cycle	kW	R
1044-1045	Float	Demand of total reactive power in last cycle	kvar	R
1046-1047	Float	Demand of total apparent power in last cycle	kVA	R
1048-1059	Float	Max. historical demand value		R
1060-1071	Float	Max. demand value in present month		R
1072-1083	Float	Max. demand value in last month		R
1084-1095	Float	Max. demand value in the month before last		R
1096-1279	Reserved			

Grid quality parameters

Address	Format	Data description	Unit	R/W
1280-1281	Float	Voltage positive sequence component	V	R
1282-1283	Float	Voltage negative sequence component	V	R
1284-1285	Float	Voltage zero sequence component	V	R
1286-1287	Float	Unbalanced voltage		R
1288-1289	Float	Current positive sequence component	A	R
1290-1291	Float	Current negative sequence component	A	R
1292-1293	Float	Current zero sequence component	A	R

1294-1295	Float	Unbalanced current		R
1296-1297	Float	Phase voltage average value	A	R
1298-1299	Float	Line voltage average value	A	R
1300-1301	Float	Current average value	A	R
1302-1303	Float	Active power average value	kW	R
1304-1305	Float	Reactive power average value	kvar	R
1306-1307	Float	Apparent power average value	kVA	R
1308-1309	Float	Phase A voltage deviation	V	R
1310-1311	Float	Phase B voltage deviation	V	R
1312-1313	Float	Phase C voltage deviation	V	R
1314-1315	Float	Line AB voltage deviation	V	R
1316-1317	Float	Line BC voltage deviation	V	R
1318-1319	Float	Line CA voltage deviation	V	R
1320-1321	Float	Frequency deviation	Hz	R
1322-1323	Float	Phase A voltage fundamental wave value	V	R
1324-1325	Float	Phase B voltage fundamental wave value	V	R
1326-1327	Float	Phase C voltage fundamental wave value	V	R
1328-1329	Float	Phase A current fundamental wave value	A	R
1330-1331	Float	Phase B current fundamental wave value	A	R
1332-1333	Float	Phase C current fundamental wave value	A	R
1334-1335	Float	Phase A voltage harmonic content	V	R
1336-1337	Float	Phase B voltage harmonic content	V	R
1338-1339	Float	Phase C voltage harmonic content	V	R
1340-1341	Float	Phase A current harmonic content	A	R
1342-1343	Float	Phase B current harmonic content	A	R
1344-1345	Float	Phase C current harmonic content	A	R
1346-1347	Float	Phase A fundamental wave active power	kW	R
1348-1349	Float	Phase B fundamental wave active power	kW	R
1350-1351	Float	Phase C fundamental wave active power	kW	R
1352-1353	Float	Total fundamental wave active power	kW	R
1354-1387	Reserved			
1388	Int	Phase angle of Phase A voltage (defaulted as 0)	0.1°	R
1389	Int	Phase angle of Phase B voltage	0.1°	R
1390	Int	Phase angle of Phase C voltage	0.1°	R
1391	Int	Phase angle of Phase A current	0.1°	R
1392	Int	Phase angle of Phase B current	0.1°	R
1393	Int	Phase angle of Phase C current	0.1°	R
1394	Int	Phase A voltage crest factor	0.001	R
1395	Int	Phase B voltage crest factor	0.001	R
1396	Int	Phase C voltage crest factor	0.001	R
1397	Int	Phase A current K factor	0.001	R
1398	Int	Phase B current K factor	0.001	R

1399	Int	Phase C current K factor	0.001	R
1400-1402		Reserved		
1403	Int	Transformer capacity factor	0.1	R
1404	Int	Phase A current percentage	0.1	R
1405	Int	Phase B current percentage	0.1	R
0406	Int	Phase C current percentage	0.1	R
1407	Int	Load percentage	0.1	R
1408	Int	Voltage qualified rate	0.1	R
1409	Int	Frequency qualified rate	0.1	R
1410	Int	Phase A voltage THD	0.01	R
1411	Int	Phase B voltage THD	0.01	R
1412	Int	Phase C voltage THD	0.01	R
1413	Int	Phase A current THD	0.01	R
1414	Int	Phase B current THD	0.01	R
1415	Int	Phase C current THD	0.01	R
1416	Int	Phase A voltage 2^{nd} harmonic content	0.01	R
1417	Int	Phase B voltage 2^{nd} harmonic content	0.01	R
1418	Int	Phase C voltage 2^{nd} harmonic content	0.01	R
1419	Int	Phase A current 2^{nd} harmonic content	0.01	R
1420	Int	Phase B current 2^{nd} harmonic content	0.0	R
1421	Int	Phase C current 2^{nd} harmonic content	0.01	R
1422-1595	Int	2^{nd} – 31^{th} harmonic content	0.01	R
1596-1787	Int	32^{nd} – 63^{rd} harmonic content	0.01	R
1788-1823	Reserved			

Waveform data

Address	Format	Data content	Data description	R/W
1824-1855	Int	Ua Real-Time Waveform data (32 points)		R
1856-1887	Int	Ub Real-Time Waveform Data (32 points)		R
1888-1919	Int	Uc Real-Time Waveform data (32 points)		R
1920-1951	Int	Ia Real Time Waveform data (32 points)		R
1952-1983	Int	Ib Real-Time Waveform Data (32 points)		R
1984-2015	Int	Ic Real-Time Waveform data (32 points)		R

Event record information

Address	Format	Data content	Data description	R/W
2016	Int	High b:yte: year; low byte: month	Power on record	R
2017	Int	High byte: day; low byte: hour		R
2018	Int	High byte: minute; low byte: second		R
2019	Int	Power on times		R

2020	Int	High b:yte: year; low byte: month	Power off record	R
2021	Int	High byte: day; low byte: hour		R
2022	Int	High byte: minute; low byte: second		R
2023	Int	Power off times		R
2024	Int	High b:yte: year; low byte: month	Parameter modification record	R
2025	Int	High byte: day; low byte: hour		R
2026	Int	High byte: minute; low byte: second		R
2027	Int	Parameter modification times		R
2028	Int	High b:yte: year; low byte: month	Demand reset record	R
2029	Int	High byte: day; low byte: hour		R
2030	Int	High byte: minute; low byte: second		R
2031	Int	Demand reset times		R
2032	Int	High b:yte: year; low byte: month	Energy clearing record	R
2033	Int	High byte: day; low byte: hour		R
2034	Int	High byte: minute; low byte: second		R
2035	Int	Energy clearing times		R
2036	Int	Alarm number		R
2037	Int	SOE number		R
2038-2047	Reserved			

Set the register

Address	Format	Data content	Data description	R/W
2048	Int	High byte: meter model	0：power supply 1：self-power ##	R/W
		Low bytes: number of modules	0：single module 1：dual module	
2049	Int	High Bytes: the current value	0：Below 100A 1：Over 100A	R/W
		Low byte: transformer type	0：80mA export 1：0.333Vexport 2：10/2.5mA	
2050	Int	Meter address	1-247	R/W
2051	Int	Baud rate	0：1200bps 1：2400bps 2：4800bps 3：9600bps 4：19200bps 5：38400bps	R/W
2052	Int	Check format	0：N,8,1 1：E,8,1 2：O,8,1 3：N,8,2	R/W
2053	Int	Pulse / DO optional	0： pulse output ##	R/W

			1：relay output	
2054	Int	High byte: wiring mode	0：3P4W 1：3P3W 2：1P2W	R/W
		Low bytes: grid frequency	0：50Hz 1：60Hz	R/W
2055	Int	Extension Module Type: Bit00: MSC-ME0 Bit01: MSC-ME1 Bit02: MSC-ME2 Bit03: MSC-ME3 Bit04: MSC-ME4 Bit05: reserved Bit06: reserved Bit07: reserved Bit08: MSC-ME8 Bit09: MSC-ME9	0：no 1：yes	R/W
2056	Int	Secondary voltage	1～690V	R/W
2057	Int	Secondary current	1～6A	R/W
2058-2059	Long	Primary voltage	1～999999V	R/W
2060-2061	Long	Primary current	1～999999A	R/W
2062	Int	Demand item	Default Ia/Ib/Ic/P/Q/S	R
2063	Int	Demand working mode	0：Slip block 1：Fixed block	R/W
2064	Int	Demand slip time（t）	1～9999s	R/W
2065	Int	Demand calculation cycle（T）	1～30T	R/W
2066	Int	Upper limit of the voltage qualification rate	0.01V	R/W
2067	Int	Lower limit of voltage qualification rate	0.01V	R/W
2068	Int	Upper limit of frequency pass rate	0.01Hz	R/W
2069	Int	Lower limit of frequency pass rate	0.01Hz	R/W
2070	Int	DO1 work mode（F4）	0：close 1：alarm 2：remote control	R/W
2071	Int	DO1 Pulse length	Pulse width：0.10～99.99s Level mode：0.00	R/W
2072	Int	DO1 Alarm item	0: Phase voltage overvoltage 1: Phase voltage undervoltage 2: Line voltage overvoltage 3: Line voltage undervoltage 4: Current overcurrent 5: Current undercurrent 6: Frequency exceeds the upper limit 7: Frequency exceeds the lower limit 8: Total active power overload 9: Total active power under load	R/W

			10: Total reactive power overload 11: Total reactive power under load 12: Total apparent power overload 13: Total apparent power under load 14: High power factor 15: Low power factor 16: High total harmonic distortion rate of voltage 17: Low total harmonic distortion rate of voltage 18: High total harmonic distortion rate of current 19: Low total harmonic distortion rate of current 20: System alarm 21: The first switch input is linked, the switch input is closed, and the relay output acts; 22: Second switch input linkage; The switch input is closed, and the relay output acts; 23: The third switch input is linked, the switch input is closed, and the relay output acts;	
2073	Int	DO1 Alarm time delay	0.00～99.99s	R/W
2074-2075	Float	DO1 Alarm value	Numerical scaling coefficient : Voltage：V Current：A Power：kW Frequency：Hz Power factor Harmonic：0.01%	R/W
2076-2077	Float	DO1 Hysteresis	Same as alarm value	R/W
2078-2085		DO2 Setting（F4）		R/W
2086-2093		DO3 setting（F4）		R/W
2094-2101		DO4 setting（F4）		R/W
2102-2109		DO setting（Self power）		R/W
2110-2127		DO setting（F9）		R/W
2128-2129	Float	Upper limit value of total active power exceeding limit	V	R/W
2130-2131	Float	Total active power exceeding upper limit hysteresis	V	R/W
2132-2133	Float	Lower limit value of total active power exceeding limit	V	R/W
2134-2135	Float	Total active power out of limit lower limit hysteresis	V	R/W
2136-2137	Float	Upper limit value of total reactive power exceeding limit	V	R/W
2138-2139	Float	Total reactive power exceeding upper limit hysteresis	V	R/W
2140-2141	Float	Lower limit value of total reactive power exceeding limit	V	R/W
2142-2143	Float	Total reactive power out of limit lower limit hysteresis	V	R/W
2144-2145	Float	Upper limit value of A-phase	V	R/W

		voltage exceeding limit		
2146-2147	Float	Upper limit hysteresis of A-phase voltage exceeding limit	V	R/W
2148-2149	Float	Upper limit value of phase B voltage exceeding limit	V	R/W
2150-2151	Float	Upper limit hysteresis of phase B voltage exceeding limit	V	R/W
2152-2153	Float	Upper limit value of C-phase voltage exceeding limit	V	R/W
2154-2155	Float	Upper limit hysteresis of C-phase voltage exceeding limit	V	R/W
2156-2157	Float	A-phase voltage out of limit lower limit value	V	R/W
2158-2159	Float	Lower limit hysteresis of A-phase voltage exceeding limit	V	R/W
2160-2161	Float	Lower limit value of phase B voltage exceeding limit	V	R/W
2162-2163	Float	Lower limit hysteresis of B-phase voltage exceeding limit	V	R/W
2164-2165	Float	Lower limit value of C-phase voltage exceeding limit	V	R/W
2166-2167	Float	Lower limit hysteresis of C-phase voltage exceeding limit	V	R/W
2168-2169	Float	Upper limit value of A-phase current exceeding limit	A	R/W
2170-2171	Float	Upper limit hysteresis of A-phase current exceeding limit	A	R/W
2172-2173	Float	Upper limit value of B-phase current exceeding limit	A	R/W
2174-2175	Float	Upper limit hysteresis of B-phase current exceeding limit	A	R/W
2176-2177	Float	Upper limit value of C-phase current exceeding limit	A	R/W
2178-2179	Float	Upper limit hysteresis of C-phase current exceeding limit	A	R/W
2180-2181	Float	Lower limit value of A-phase current exceeding limit	A	R/W
2182-2183	Float	Lower limit hysteresis of A-phase current exceeding limit	A	R/W
2184-2185	Float	Lower limit value of B-phase current exceeding limit	A	R/W
2186-2187	Float	Lower limit hysteresis of B-phase current exceeding limit	A	R/W
2188-2189	Float	Lower limit value of C-phase current exceeding limit	A	R/W

2190-2191	Float	Lower limit hysteresis of C-phase current exceeding limit	A	R/W
2192-2193	Float	Upper limit value of A-phase active power exceeding limit	kW	R/W
2194-2195	Float	A-phase active power limit exceeding upper limit hysteresis	kW	R/W
2196-2197	Float	Upper limit value of B-phase active power exceeding limit	kW	R/W
2198-2199	Float	B-phase active power limit exceeding upper limit hysteresis	kW	R/W
2200-2201	Float	Upper limit value of C-phase active power exceeding limit	kW	R/W
2202-2203	Float	Upper limit hysteresis of C-phase active power exceeding limit	kW	R/W
2204-2205	Float	Lower limit value of A-phase active power exceeding limit	kW	R/W
2206-2207	Float	A-phase active power out of limit lower limit hysteresis	kW	R/W
2208-2209	Float	Lower limit value of B-phase active power exceeding limit	kW	R/W
2210-2211	Float	B-phase active power out of limit lower limit hysteresis	kW	R/W
2212-2213	Float	Lower limit value of C-phase active power exceeding limit	kW	R/W
2214-2215	Float	Lower limit hysteresis of C-phase active power exceeding limit	kW	R/W
2216-2217	Float	Upper limit value of A-phase reactive power exceeding limit	kW	R/W
2218-2219	Float	A-phase reactive power limit exceeding upper limit hysteresis	kW	R/W
2220-2221	Float	Upper limit value of reactive power exceeding limit for phase B	kW	R/W
2222-2223	Float	B-phase reactive power limit exceeding upper limit hysteresis	kW	R/W
2224-2225	Float	Upper limit value of C-phase reactive power exceeding limit	kW	R/W
2226-2227	Float	Upper limit hysteresis of C-phase reactive power exceeding limit	kW	R/W
2228-2229	Float	Lower limit value of A-phase reactive power exceeding limit	kW	R/W
2230-2231	Float	Lower limit hysteresis of A-phase reactive power exceeding limit	kW	R/W
2232-2233	Float	Lower limit value of B-phase reactive power exceeding limit	kW	R/W
2234-2235	Float	Lower limit hysteresis of B-phase	kW	R/W

		reactive power exceeding limit		
2236-2237	Float	Lower limit value of C-phase reactive power exceeding limit	kW	R/W
2238-2239	Float	Lower limit hysteresis of C-phase reactive power exceeding limit	kW	R/W
2240	Int	The upper limit value of the first channel temperature exceeding the limit	0.1℃	R/W
2241	Int	The hysteresis of the first temperature exceeding the upper limit	0.1℃	R/W
2242	Int	The upper limit value of the second circuit temperature exceeding the limit	0.1℃	R/W
2243	Int	Second circuit temperature exceeding upper limit hysteresis	0.1℃	R/W
2244	Int	The upper limit value of the third channel temperature exceeding the limit	0.1℃	R/W
2245	Int	The hysteresis of the third circuit temperature exceeding the upper limit	0.1℃	R/W
2246	Int	Upper limit value of the fourth circuit temperature exceeding limit	0.1℃	R/W
2247	Int	Fourth temperature limit exceeding upper limit hysteresis	0.1℃	R/W
2248	Int	Lower limit value of the first temperature exceeding limit	0.1℃	R/W
2249	Int	Lower limit hysteresis of the first temperature exceeding limit	0.1℃	R/W
2250	Int	Lower limit value of second circuit temperature exceeding limit	0.1℃	R/W
2251	Int	Lower limit hysteresis of second circuit temperature exceeding limit	0.1℃	R/W
2252	Int	Lower limit value of the third circuit temperature exceeding limit	0.1℃	R/W
2253	Int	Lower limit hysteresis of the third circuit temperature exceeding limit	0.1℃	R/W
2254	Int	Lower limit value of the fourth circuit temperature exceeding limit	0.1℃	R/W
2255	Int	Lower limit hysteresis of the fourth temperature exceeding limit	0.1℃	R/W
2256	Int	The upper limit value of the first circuit leakage exceeding the limit	0.1mA	R/W
2257	Int	First circuit leakage limit exceeding upper limit hysteresis amount	0.1mA	R/W
2258	Int	Upper limit value of second circuit leakage exceeding limit	0.1mA	R/W
2259	Int	Second circuit leakage limit exceeding	0.1mA	R/W

		upper limit hysteresis amount		
2260	Int	Upper limit value of third circuit leakage exceeding limit	0.1mA	R/W
2261	Int	Third circuit leakage limit exceeding upper limit hysteresis amount	0.1mA	R/W
2262	Int	Lower limit value of the first circuit leakage exceeding the limit	0.1mA	R/W
2263	Int	Lower limit hysteresis of the first circuit leakage exceeding the limit	0.1mA	R/W
2264	Int	Lower limit value of second circuit leakage exceeding limit	0.1mA	R/W
2265	Int	Second circuit leakage limit exceeding lower limit hysteresis amount	0.1mA	R/W
2266	Int	Lower limit value of third circuit leakage exceeding limit	0.1mA	R/W
2267	Int	Third circuit leakage limit exceeding lower limit hysteresis amount	0.1mA	R/W
2268	Int	Upper limit value of frequency exceeding limit		R/W
2269	Int	Frequency limit exceeding upper limit hysteresis		R/W
2270	Int	Lower limit value of frequency exceeding limit		R/W
2271	Int	Lower limit hysteresis of frequency exceeding limit		R/W
2172-2275	Reserved			
2276	Int	A-phase voltage upper limit alarm enable	0：Close 1：Open	R/W
2277	Int	B-phase voltage upper limit alarm enable	0：Close 1：Open	R/W
2278	Int	C-phase voltage upper limit alarm enable	0：Close 1：Open	R/W
2279	Int	A-phase voltage lower limit alarm enable	0：Close 1：Open	R/W
2280	Int	B-phase voltage lower limit alarm enable	0：Close 1：Open	R/W
2281	Int	C-phase voltage lower limit alarm enable	0：Close 1：Open	R/W
2282	Int	A-phase current upper limit alarm enable	0：Close 1：Open	R/W
2283	Int	B-phase current upper limit alarm enable	0：Close 1：Open	R/W
2284	Int	C-phase current upper limit alarm enable	0：Close 1：Open	R/W
2285	Int	A-phase current lower limit alarm	0：Close	R/W

		enable	1：Open	
2286	Int	B-phase current lower limit alarm enable	0：Close 1：Open	R/W
2287	Int	C-phase current lower limit alarm enable	0：Close 1：Open	R/W
2288	Int	Phase A active power limit alarm enabled	0：Close 1：Open	R/W
2289	Int	Phase B active power limit alarm enabled	0：Close 1：Open	R/W
2290	Int	Phase C active power upper limit alarm is enabled	0：Close 1：Open	R/W
2291	Int	Phase A active power limit alarm enabled	0：Close 1：Open	R/W
2292	Int	Phase B active power lower limit alarm enabled	0：Close 1：Open	R/W
2293	Int	C phase active power lower limit alarm enabled	0：Close 1：Open	R/W
2294	Int	A-phase reactive power upper limit alarm enabled	0：Close 1：Open	R/W
2295	Int	B phase reactive power ceiling alarm enabled	0：Close 1：Open	R/W
2296	Int	C phase reactive power ceiling alarm enabled	0：Close 1：Open	R/W
2297	Int	A-phase reactive power lower limit alarm enabled	0：Close 1：Open	R/W
2298	Int	Phase B lower limit of reactive power alarm enabled	0：Close 1：Open	R/W
2299	Int	C phase reactive power lower limit alarm enabled	0：Close 1：Open	R/W
2300	Int	Enable the first temperature upper limit alarm	0：Close 1：Open	R/W
2301	Int	Enable the second temperature upper limit alarm	0：Close 1：Open	R/W
2302	Int	Enable the third temperature upper limit alarm	0：Close 1：Open	R/W
2303	Int	Enable the fourth temperature upper limit alarm	0：Close 1：Open	R/W
2304	Int	Enable the first temperature lower limit alarm	0：Close 1：Open	R/W
2305	Int	Enable the second temperature lower limit alarm	0：Close 1：Open	R/W
2306	Int	Enable the third temperature lower limit alarm	0：Close 1：Open	R/W
2307	Int	Enable the fourth temperature lower limit alarm	0：Close 1：Open	R/W

2308	Int	Enable the first circuit leakage upper limit alarm	0：Close 1：Open	R/W
2309	Int	Enable the second circuit leakage upper limit alarm	0：Close 1：Open	R/W
2310	Int	Enable the third circuit leakage upper limit alarm	0：Close 1：Open	R/W
2311	Int	Enable the first circuit leakage lower limit alarm	0：Close 1：Open	R/W
2312	Int	Enable the second circuit leakage lower limit alarm	0：Close 1：Open	R/W
2313	Int	Enable the third circuit leakage lower limit alarm	0：Close 1：Open	R/W
2314	Int	Upper frequency limit alarm is enabled	0：Close 1：Open	R/W
2315	Int	Lower frequency limit alarm enables	0：Close 1：Open	R/W
2316	Int	Phase order alarm enabling	0：Close 1：Open	R/W
2317	Int	Total active power ceiling alarm is enabled	0：Close 1：Open	R/W
2318	Int	Total active power lower limit alarm is enabled	0：Close 1：Open	R/W
2319	Int	Total reactive power ceiling alarm is enabled	0：Close 1：Open	R/W
2320	Int	Total reactive power lower limit alarm is enabled	0：Close 1：Open	R/W
2321	Int	The fifth road temperature exceeds the upper limit value	0.1℃	R/W
2322	Int	The upper limit of the fifth road temperature limit	0.1℃	R/W
2323	Int	The sixth road temperature limit exceeds the upper limit	0.1℃	R/W
2324	Int	The sixth route temperature exceeds the upper limit	0.1℃	R/W
2325	Int	The seventh road temperature is beyond the upper limit	0.1℃	R/W
2326	Int	The seventh road temperature beyond the upper limit of stagnation	0.1℃	R/W
2327	Int	The eighth road temperature exceeds the upper limit	0.1℃	R/W
2328	Int	The eighth route temperature limit exceeds the upper limit	0.1℃	R/W
2329	Int	The fifth road temperature limit is below the limit	0.1℃	R/W
2330	Int	The fifth road temperature beyond the	0.1℃	R/W

		lower limit of the stagnation amount		
2331	Int	The sixth road temperature limit	0.1℃	R/W
2332	Int	The sixth road temperature exceeds the lower limit of the stagnation amount	0.1℃	R/W
2333	Int	The seventh road temperature limit	0.1℃	R/W
2334	Int	The seventh road temperature beyond the lower limit of the stagnation amount	0.1℃	R/W
2335	Int	Lower limit of the eighth road temperature	0.1℃	R/W
2336	Int	The eighth circuit temperature beyond the lower limit of the stagnation amount	0.1℃	R/W
2337	Int	The fourth road leakage limit exceeds the upper limit value	0.1mA	R/W
2338	Int	The fourth leakage limit limit back lag	0.1mA	R/W
2339	Int	The fifth road leakage exceeds the upper limit value	0.1mA	R/W
2340	Int	The fifth road leakage limit limit back lag	0.1mA	R/W
2341	Int	The sixth road leakage exceeds the upper limit value	0.1mA	R/W
2342	Int	The sixth road leakage limit limit back lag	0.1mA	R/W
2343	Int	The fourth road leakage exceeds the limit	0.1mA	R/W
2344	Int	The fourth leakage limit lag	0.1mA	R/W
2345	Int	The fifth road leakage beyond the limit of the lower limit	0.1mA	R/W
2346	Int	The fifth leakage limit lag	0.1mA	R/W
2347	Int	The sixth road leakage exceeds the limit	0.1mA	R/W
2348	Int	The sixth road leakage limit of the lower limit lag	0.1mA	R/W
2349	Int	Fifth road temperature upper limit alarm is enabled	0：Close 1：Open	R/W
2350	Int	Sixth temperature limit alarm enabled	0：Close 1：Open	R/W
2351	Int	The seventh road temperature upper limit alarm is enabled	0：Close 1：Open	R/W
2352	Int	Eighth upper temperature alarm enabled	0：Close 1：Open	R/W
2353	Int	Fifth road temperature lower limit alarm enabled	0：Close 1：Open	R/W
2354	Int	Sixth road temperature lower limit alarm enabled	0：Close 1：Open	R/W
2355	Int	The seventh road lower temperature limit alarm is enabled	0：Close 1：Open	R/W

2356	Int	The eighth road lower limit temperature alarm is enabled	0：Close 1：Open	R/W
2357	Int	The fourth circuit leakage upper limit alarm is enabled	0：Close 1：Open	R/W
2358	Int	The fifth leakage limit alarm enabled	0：Close 1：Open	R/W
2359	Int	The sixth leakage limit alarm enabled	0：Close 1：Open	R/W
2360	Int	The fourth circuit leakage lower limit alarm is enabled	0：Close 1：Open	R/W
2361	Int	The fifth circuit leakage lower limit alarm is enabled	0：Close 1：Open	R/W
2362	Int	Sixth road leakage lower limit alarm enabled	0：Close 1：Open	R/W
2363-2374	Char	First set of rate settings	12 period minutes, hour The first time period is fixed as 00：00	R/W
2375-2386	Char	Second set of rate settings	12 period minutes, hour The first time period is fixed as 00：00	R/W
2387-2392	Char	First set of rate and rate settings	The corresponding rate type of the first set of rate period: 0-sharp, 1-peak, 2-flat, 3-valley	R/W
2393-2398	Char	Second set of rate and rate settings	The corresponding rate type of the second set of rate period: 0-sharp, 1-peak, 2-flat, 3-valley	R/W
2399-2404	Char	Monthly rate selection	0：first rate 1：second rate	R/W
2405	Char	Meter reading date setting	Automatic meter reading: time, day	R/W

Software version number

Address	Format	Data content	Data description	R/W
65280-65295	Int	Software version number of the main module		R
65296-65311	Int	Extension Module 1 software version No		R
65312-65327	Int	Extension Module 2 software version No		R
65328-65503	reserved			
65504-65519	Int	Meter model		R

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