SFERE700

Distributed Multi-Loop Power Monitoring Unit

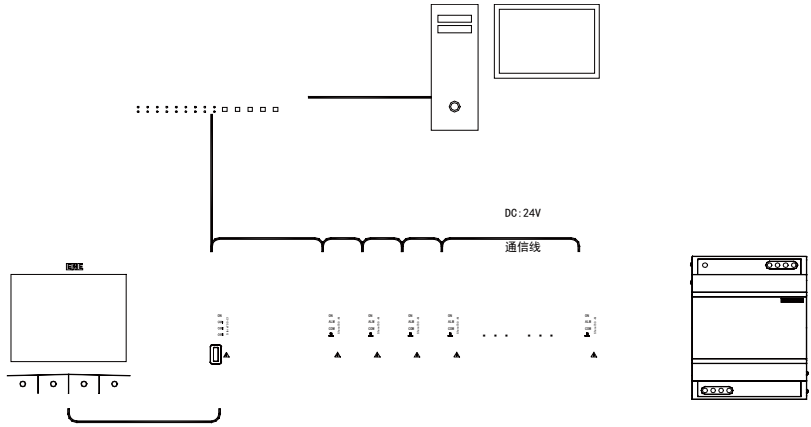
Communication Manual
-Modbus-RTU

JIANGSU SFERE ELECTRIC CO., LTD.

Content

1. Introduction

Sfere700-C1, the communication module in Sfere700, applies Modbus-RTU protocol and has three digital communication interfaces. #1 Interface connects monitoring module Sfere700-M; #2 Interface connects host computer; #3 Interface connects display module Sfere700-D1.



communication wire：

#3 interface connects Sfere700-D1. Both sides automatically match and no need to set the operation.

#1 interface connects Sfere700-M. Automatic / manual networking is realized by communication module.

#2 interface connects host computer for transmission. The commands from host computer will be transmitted to Sfere700-M without any change, so will the response of Sfere700-M to host computer.

2. Communication

2.1 Physical layer

The communication interface of Sfere700-M 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 compare the two CRC value. If the two value are not equal to each other, 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）

	Frame structure	address code	function code	data code		CRC check code
				initial switch address	number of switches	
Host request	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）

	Frame structure	address code	function code	data code		CRC check code
				initial register address	number of register	
Host request	Byte	1 byte	1 byte	2 bytes	2 bytes	2 bytes
	data range	1～247	0x03/ 0x04		Max 100	CRC16
	message	0x01	0x03	0x00 0x06	0x00 0x06	0XE4 0x36

	example					
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）

	frame structure	address code	function code	data code		CRC check code
				initial relay address	relay action value	
host request	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）

host request	frame structure	address code	function code	data code				CRC check 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)

Host request	Frame structure	Address code	Function code	Data code				Check code
				initial	numbe	numbe	Write	

				relay address	r of relay	r of data byte	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	0x0000-0x000d
Sub-request x, recording No.	2 bytes	0x0000-0x001F
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
Voltage swell event	0x0001	0x0000～0x000F: 0: latest volt age swell event 1: last voltage swell event ...	1～9
Voltage sag event	0x0002	0x0000～0x000F: 0: latest voltage sag event 1: last voltage sag event ...	1～9

Voltage interruption	0x0003	0x0000～0x000F: 0: latest interruption event 1: last interruption event ...	1～9
Over voltage	0x0008	0x0000-0x0009: 0x0000: latest over voltage event recording 0x0001:last over voltage event recording ... 0x0009:last 9th over voltage event recording	1~12
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:

	Frame structure	Address code	Function code	Data code					Check code
				Byte counting	Parameter type	Document No.	Recording No.	Recording length	
Host request	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

	Frame structure	Address code	Function code	Data code				Check code
				Response data length	Document response length	Parameter type	Recording data	
Slave response	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.

2.3.9 Read voltage swell event recording:

	Frame structure	Address code	Function code	Data code					Check code
				Byte counting	Parameter type	Document No.	Recording No.	Recording length	
Host request	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	0x0001	0～15	1～10	CRC16
	Message example	0x01	0x14	0x07	0x06	0x0001	0x0000	0x000A	0x04E2
Slave	Frame	Addr	Functi	Data code					Chec

respo nse	struct ure	ess code	on code	Respons e data length	Documen t response length	Paramet er type	Recording data	k code
	Byte	1 byte	1 byte	1 byte	1 byte	1 byte	18 bytes	2 bytes
	Messa ge examp le	0x01	0x14	0x14	0x13	0x06	Swell recording data	CRC1 6

Voltage swell, sag and interruption recording

The device has 16 pieces of voltage swell recording, 16 pieces of voltage sag recording, 16 pieces of voltage interruption recording. Voltage swell, voltage sag and voltage interruption will be handled once every 10ms. It contain start time, end time and voltage extreme value. The threshold and hysteresis of voltage swell, sag, interruption can be set through communication.

Data format of voltage swell, sag and interruption:

Year, month, day, hour, minute, second, millisecond (start time) (8byte) + Year, month, day, hour, minute, second, millisecond (end time) (8byte) + voltage limits (4byte Floating point data)

For example：

0E 03 05 08 14 01 00 78 0E 03 05 08 14 01 02 00 43 ED 80 00

0E 03 05 08 14 01 00 78: Start time: 2014, March, 5th, 8 o'clock, 20 minutes, 1 second, 120 millisecond.

0E 03 05 08 14 01 02 00：End time: 2014, March, 5th, 8 o'clock, 20 minutes, 1 second, 512 milliseconds.

43ED8080：Floating point data voltage limit of 475.0V. As for swell event recording, this value is the maximum voltage value during swell; as for sag recording and voltage interruption recording, this value is the minimum voltage value during the sag.

2.3.10 Read over voltage event recording

Host	Frame	Addr	Functi	Data code	Chec

request	structure	ess code	on code	Byte counting	Parameter type	Document No.	Recording No.	Recording length	k code
	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	0～09	1～12	CRC16
	Message example	0x01	0x14	0x07	0x06	0x0003	0x0000	0x000c	0x7D22
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	over voltage recording		CRC16

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

The device can record up to 10 pieces of events including over voltage, under voltage, over current, under current, over load power and under load power. It judge and process these events every500ms. Event record contains start time, end time and corresponding voltage/current/power extreme value. Threshold value 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：0E 03 05 08 14 01 0E 03 05 08 14 05 43 E4 66 66 43 E4 00 00 43 E4 80 00

0E 03 05 08 14 01:

Start time: 14(year)3(month)5(day)8(hour)20(minute)1(second)

0E 03 05 08 14 05 ：

End time: 12(year)3(month)5(day)8(hour)20(minute)5(second)

43E46666: 456.8V

43E40000: 456V

43E48080: 457V

If it is voltage swell event, this is the max. voltage value (phase voltage in three phase four wire mode, line voltage in three phase three wire mode); if it is under voltage event, it is min. voltage value. The data format of over current, under current, over power, under power is the same as above.

2.4 Data format

2.4.1 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

2.4.2 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%

2.4.3 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%

3. MODBUS-RTU Communication List

3.1 Electrical variables 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
000A-000B	Float	Phase C voltage	V	R
000C-000D	Float	Line AB voltage	V	R
000E-000F	Float	Line BC voltage	V	R
0010-0011	Float	Line CA voltage	V	R
0012-0013	Float	Phase A current	A	R
0014-0015	Float	Phase B current	A	R
0016-0017	Float	Phase C current	A	R
0018-0019	Float	In current (reserved)	A	R
001A-001B	Float	Phase A active power	kW	R
001C-001D	Float	Phase B active power	kW	R
001E-001F	Float	Phase C active power	kW	R
0020-0021	Float	Total active power	kW	R
0022-0023	Float	Phase A reactive power	kvar	R
0024-0025	Float	Phase B reactive power	kvar	R
0026-0027	Float	Phase C reactive power	kvar	R
0028-0029	Float	Total reactive power	kvar	R
002A-002B	Float	Phase A apparent power	kVA	
002C-002D	Float	Phase B apparent power	kVA	
002E-002F	Float	Phase C apparent power	kVA	
0030-0031	Float	Total apparent power	kVA	R
0032-0033	Float	Phase A power factor		
0034-0035	Float	Phase B power factor		
0036-0037	Float	Phase C power factor		
0038-0039	Float	Total power factor		R
003A-003B	Float	Grid frequency	Hz	R

003C-003D	Float	Import active energy EP+	kWh	R
003E-003F	Float	Export active energy EP-	kWh	R
0040-0041	Float	Import reactive energy EQ+	kvarh	R
0042-0043	Float	Export reactive energy EQ-	kvarh	R
0044-0045	Float	Apparent energy	kVA	R
0046-0047	Float	First quadrant reactive energy	kvarh	R
0048-0049	Float	Second quadrant reactive energy	kvarh	R
004A-004B	Float	Third quadrant reactive energy	kvarh	R
004C-004D	Float	Fourth quadrant reactive energy	kvarh	R
004E-004F	Float	Import fundamental wave active energy	kWh	R
0050-0051	Float	Export fundamental wave active energy	kWh	R
0052-0053	Float	Import fundamental wave reactive energy	kvarh	R
0054-0055	Float	Export fundamental wave reactive energy	kvarh	R
0056-0057	Float	Phase A import active energy	kWh	R
0058-0059	Float	Phase B import active energy	kWh	R
005A-005B	Float	Phase C import active energy	kWh	R
005C-005D	Float	Phase A export active energy	kWh	R
005E-005F	Float	Phase B export active energy	kWh	R
0060-0061	Float	Phase C export active energy	kWh	R
0062-0063	Float	Phase A import reactive energy	kvarh	R
0064-0065	Float	Phase B import reactive energy	kvarh	R
0066-0067	Float	Phase C import reactive energy	kvarh	R
0068-0069	Float	Phase A export reactive energy	kvarh	R
006A-006B	Float	Phase B export reactive energy	kvarh	R
006C-006D	Float	Phase C export reactive energy	kvarh	R

006E-006F	Float	Present total active energy	kWh	R
0070-0071	Float	Present tariff #1 active energy	kWh	R
0072-0073	Float	Present tariff #2 active energy	kWh	R
0074-0075	Float	Present tariff #3 active energy	kWh	R
0076-0077	Float	Present tariff #4 active energy	kWh	R
0078-0079	Float	Total active energy of present month	kWh	R
007A-007B	Float	Tariff #1 active energy of present month	kWh	R
007C-007D	Float	Tariff #2 active energy of present month	kWh	R
007E-008F	Float	Tariff #3 active energy of present month	kWh	R
0080-0081	Float	Tariff #4 active energy of present month	kWh	R
0082-0083	Float	Total active energy of last month	kWh	R
0084-0085	Float	Tariff #1 active energy of last month	kWh	R
0086-0087	Float	Tariff #2 active energy of last month	kWh	R
0088-0089	Float	Tariff #3 active energy of last month	kWh	R
008A-008B	Float	Tariff #4 active energy of last month	kWh	R
008C-008D	Float	Total active energy of the month before last	kWh	R
008E-008F	Float	Tariff #1 active energy of the month before last	kWh	R
0090-0091	Float	Tariff #2 active energy of the month before last	kWh	R
0092-0093	Float	Tariff #3 active energy of the month before last	kWh	R
0094-0095	Float	Tariff #4 active energy of the month before last	kWh	R

0096-0097	Float	Total active energy of the third month before this month	kWh	R
0098-0099	Float	Tariff #1 active energy of the third month before this month	kWh	R
009A-009B	Float	Tariff #2 active energy of the third month before this month	kWh	R
009C-009D	Float	Tariff #3 active energy of the third month before this month	kWh	R
009E-009F	Float	Tariff #4 active energy of the third month before this month	kWh	R
00A0-00A1	Float	Total active energy of the fourth month before this month	kWh	R
00A2-00A3	Float	Tariff #1 active energy of the fourth month before this month	kWh	R
00A4-00A5	Float	Tariff #2 active energy of the fourth month before this month	kWh	R
00A6-00A7	Float	Tariff #3 active energy of the fourth month before this month	kWh	R
00A8-00A9	Float	Tariff #4 active energy of the fourth month before this month	kWh	R
00AA-00AB	Float	Total active energy of the fifth month before this month	kWh	R
00AC-00AD	Float	Tariff #1 active energy of the fifth month before this month	kWh	R
00AE-00AF	Float	Tariff #2 active energy of the fifth month before this month	kWh	R
00B0-00B1	Float	Tariff #3 active energy of the fifth month before this month	kWh	R
00B2-00B3	Float	Tariff #4 active energy of the fifth month before this month	kWh	R

00B4-00B5	Float	Total active energy of the sixth month before this month	kWh	R
00B6-007	Float	Tariff #1 active energy of the sixth month before this month	kWh	R
00B8-00B9	Float	Tariff #2 active energy of the sixth month before this month	kWh	R
00BA-00BB	Float	Tariff #3 active energy of the sixth month before this month	kWh	R
00BC-00BD	Float	Tariff #4 active energy of the sixth month before this month	kWh	R
00BE-00BF	Float	Total active energy of the seventh month before this month	kWh	R
00C0-00C1	Float	Tariff #1 active energy of the seventh month before this month	kWh	R
00C2-00C3	Float	Tariff #2 active energy of the seventh month before this month	kWh	R
00C4-00C5	Float	Tariff #3 active energy of the seventh month before this month	kWh	R
00C6-00C7	Float	Tariff #4 active energy of the seventh month before this month	kWh	R
00C8-00C9	Float	Total active energy of the eighth month before this month	kWh	R
00CA-00CB	Float	Tariff #1 active energy of the eighth month before this month	kWh	R
00CC-00CD	Float	Tariff #2 active energy of the eighth month before this month	kWh	R
00CE-00CF	Float	Tariff #3 active energy of the eighth month before this month	kWh	R
00D0-00D1	Float	Tariff #4 active energy of the eighth month before this month	kWh	R

00D2-00D3	Float	Total active energy of the ninth month before this month	kWh	R
00D4-00D5	Float	Tariff #1 active energy of the ninth month before this month	kWh	R
00D6-00D7	Float	Tariff #2 active energy of the ninth month before this month	kWh	R
00D8-00D9	Float	Tariff #3 active energy of the ninth month before this month	kWh	R
00DA-00DB	Float	Tariff #4 active energy of the ninth month before this month	kWh	R
00DC-00DD	Float	Total active energy of the tenth month before this month	kWh	R
00DE-00DF	Float	Tariff #1 active energy of the tenth month before this month	kWh	R
00E0-00E1	Float	Tariff #2 active energy of the tenth month before this month	kWh	R
00E2-00E3	Float	Tariff #3 active energy of the tenth month before this month	kWh	R
00E4-00E5	Float	Tariff #4 active energy of the tenth month before this month	kWh	R
00E6-00E7	Float	Total active energy of the eleventh month before this month	kWh	R
00E8-00E9	Float	Tariff #1 active energy of the eleventh month before this month	kWh	R
00EA-00EB	Float	Tariff #2 active energy of the eleventh month before this month	kWh	R
00EC-00ED	Float	Tariff #3 active energy of the eleventh month before this month	kWh	R
00EE-00EF	Float	Tariff #4 active energy of the eleventh month before this month	kWh	R

3.2 System status and switch information

Address	Format	Data description	Unit	R/W
00F0	char	High byte: year; low byte: month		R
00F1	char	High byte: day; low byte: hour		R
00F2	char	High byte: minute; low byte: second		R
00F3	char	High byte: week; low byte: reserved		R
00F4	Int	Relay output status：0-OFF，1-ON Bit0: first relay output status		R
00F5	Int	Digital input information：0-OFF，1-ON Bit0： first digital input status Bit1： second digital input status		R
00F6	bit	System status： Bit 0: voltage phase sequence status， 0：normal； 1：abnormal Bit1：frequency status, 0：normal； 1：abnormal Bit2: voltage signal， 0：normal； 1：abnormal Bit3: current sequence status 0：normal； 1：abnormal Bit4： high voltage 0： no high voltage alarm 1： high voltage alarm Bit5： low voltage alarm， 0: no low voltage alarm 1： low voltage alarm Bit6： high current alarm： 0：no high current alarm 1：high current alarm		

		Bit7：low current alarm: 0: no low current alarm 1：low current alarm Bit8：high active power alarm 0： no high active power alarm 1：high active power alarm Bit9: low active power alarm 0：no low active power alarm 1：low active power alarm		
00F7	Int	M Module type：0:M1 1:M2 2:M3		
00F8-00F9	Long	DI1 pulse counting	个	R
00FA-00FB	Long	DI2 pulse counting	个	R
00FC-00FD	float	DI1 corresponding data to pulse		R
00FE-00FF	float	DI2 corresponding data to pulse		R

3.3 Max./min. value data

Address	Format	Data description	Unit	R/W
0100-0101	float	Max. historical data of Phase A	V	R
0102-0103	float	Max. historical data of Phase B	V	R
0104-0105	float	Max. historical data of Phase C	V	R
0106-0107	float	Max. historical data of Line AB voltage	V	R
0108-0109	float	Max. historical data of Line BC voltage	V	R
010A-010B	float	Max. historical data of Line CA voltage	V	R
010C-010D	float	Max. historical data of Phase A current	A	R
010E-010F	float	Max. historical data of Phase B current	A	R
0110-0111	float	Max. historical data of Phase C current	A	R
0112-0113	float	Max. historical data of In (3P4W)	A	R
0114-0115	float	Max. historical data of total active power	1W	R
0116-0117	float	Max. historical data of total reactive power	kW	R

0118-0119	float	Max. historical data of total apparent power	kW	R
011A-011B	float	Max. historical data of total power factor	kW	R
011C-011D	float	Max. historical data of Frequency	Hz	R
011E-011F	float	Min. historical data of Phase A voltage	V	R
0120-0121	float	Min. historical data of Phase B voltage	V	R
0122-0123	float	Min. historical data of Phase C voltage	V	R
0124-0125	float	Min. historical data of Line AB voltage	V	R
0126-0127	float	Min. historical data of Line BC voltage	V	R
0128-0129	float	Min. historical data of Line CA voltage	V	R
012A-012B	float	Min. historical data of Phase A current	A	R
012C-012D	float	Min. historical data of Phase B current	A	R
012E-012F	float	Min. historical data of Phase C current	A	R
0130-0131	float	Min. historical data of In (3P4W)	A	R
0132-0133	float	Min. historical data of total active power	1W	R
0134-0135	float	Min. historical data of total reactive power	kW	R
0136-0137	float	Min. historical data of total apparent power	kW	R
0138-0139	float	Min. historical data of total power factor	kW	R
013A-013B	float	Min. historical data of frequency	Hz	R
013C-013D	float	Max. historical data of Phase A voltage in present month	V	R
013E-013F	float	Max. historical data of Phase B voltage in present month	V	R
0140-0141	float	Max. historical data of Phase C voltage in present month	V	R
0142-0143	float	Max. historical data of Line AB voltage in present month	V	R
0144-0145	float	Max. historical data of Line BC voltage in	V	R

		present month		
0146-0147	float	Max. historical data of Line CA voltage in present month	V	R
0148-0149	float	Max. historical data of Phase A current in present month	A	R
014A-014B	float	Max. historical data of Phase B current in present month	A	R
014C-014D	float	Max. historical data of Phase C current in present month	A	R
014E-014F	float	Max. historical data of In (3P4W) in present month	A	R
0150-0151	float	Max. historical data of total active power in present month	kW	R
0152-0153	float	Max. historical data of total reactive power in present month	kW	R
0154-0155	float	Max. historical data of total apparent power in present month	kW	R
0156-0157	float	Max. historical data of total power factor in present month	kW	R
0158-0159	float	Max. historical data of frequency in present month	Hz	R
015A-015B	float	Min. historical data of Phase A voltage in present month	V	R
015C-015D	float	Min. historical data of Phase B voltage in present month	V	R
015E-015F	float	Min. historical data of Phase C voltage in present month	V	R
0160-0161	float	Min. historical data of Line AB voltage in present month	V	R
0162-0163	float	Min. historical data of Line BC voltage in	V	R

		present month		
0164-0165	float	Min. historical data of Line CA voltage in present month	V	R
0166-0167	float	Min. historical data of Phase A current in present month	A	R
0168-0169	float	Min. historical data of Phase B current in present month	A	R
016A-016B	float	Min. historical data of Phase C current in present month	A	R
016C-016D	float	Min. historical data of In (3P4W) in present month	A	R
016E-016F	float	Min. historical data of total active power in present month	kW	R
0170-0171	float	Min. historical data of total reactive power in present month	kW	R
0172-0173	float	Min. historical data of total apparent power in present month	kW	R
0174-0175	float	Min. historical data of total power factor in present month	kW	R
0176-0177	float	Min. historical data of frequency in present month	Hz	R
0178-01B3	float	Max./min. value of last month		R
01B4-01EF	float	Max./min. value of the month before last		R
01F0-03FF	Reserved			

3.4 Demand data

Address	Format	Data description	Unit	R/W
0400-0401	float	Present demand of Phase A current	1A	R
0402-0403	float	Present demand of Phase B current	A	R
0404-0405	float	Present demand of Phase C current	A	R

0406-0407	float	Present demand of total active power	kW	R
0408-0409	float	Present demand of total reactive power	kvar	R
040A-040B	float	Present demand of total apparent power	kVA	R
040C-040D	float	Demand of Phase A current in last cycle	1A	R
040E-040F	float	Demand of Phase B current in last cycle	A	R
0410-0411	float	Demand of Phase C current in last cycle	A	R
0412-0413	float	Demand of total active power in last cycle	kW	R
0414-0415	float	Demand of total reactive power in last cycle	kvar	R
0416-0417	float	Demand of total apparent power in last cycle	kVA	R
0418-0423		Max. historical demand value		R
0424-042F		Max. demand value in present month		R
0430-04A1		Max. demand value in last month		R
043C-0447		Max. demand value in the month before last		R
0448-04FF	Reserved			

3.5 Grid quality parameters

Address	Format	Data description	Unit	R/W

0500-0501	float	Voltage positive sequence component	V	R
0502-0503	float	Voltage negative sequence component	V	R
0504-0505	float	Voltage zero sequence component	V	R
0506-0507	float	Unbalanced voltage		R
0508-0509	float	Current positive sequence component	V	R
050A-050B	float	Current negative sequence component	V	R
050C-050D	float	Current zero sequence component	V	R
050E-050F	float	Unbalanced current		R
0510-0511	float	Phase voltage average value	A	R
0512-0513	float	Line voltage average value	A	R
0514-0515	float	Current average value	A	R
0516-0517	float	Active power average value	kW	R
0518-0519	float	Reactive power average value	kvar	R
051A-051B	float	Apparent power average value	kVA	R
051C-051D	float	Phase A voltage deviation	V	R
051E-051F	float	Phase B voltage deviation	V	R
0520-0521	float	Phase C voltage deviation	V	R
0522-0523	float	Line AB voltage deviation	V	R
0524-0525	float	Line BC voltage deviation	V	R
0526-0527	float	Line CA voltage deviation	V	R
0528-0529	float	Frequency deviation	Hz	R
502A-052B	float	Phase A voltage fundamental wave value	V	
052C-052D	float	Phase B voltage fundamental wave value	V	
052E-052F	float	Phase C voltage fundamental wave value	V	
0530-0531	float	Phase A current fundamental wave value	A	
0532-0533	float	Phase B current fundamental wave value	A	
0534-0535	float	Phase C current fundamental wave value	A	

0536-0537	float	Phase A voltage harmonic content	V	R
0538-0539	float	Phase B voltage harmonic content	V	R
053A-053B	float	Phase C voltage harmonic content	V	R
053C-053D	float	Phase A current harmonic content	A	R
053E-053F	float	Phase B current harmonic content	A	R
0540-0541	float	Phase C current harmonic content	A	R
0542-0543	float	Phase A fundamental wave active power	kW	R
0544-0545	float	Phase B fundamental wave active power	kW	R
0546-0547	float	Phase C fundamental wave active power	kW	R
0548-0549	float	Total fundamental wave active power	kW	R
054A-054B	float	Fundamental wave reactive power	kvar	R
054C-054D	float	Fundamental wave apparent power	kVA	R
054E-054F	float	Fundamental wave power factor		R
0550-0551	Long	Meter running time	s	R
0552-0553	Long	Load running time	s	R
0554-056B	Int	Reserved		
056C	Int	Phase angle of Phase A voltage (defaulted as 0)	0.1°	R
056D	Int	Phase angle of Phase B voltage	0.1°	R
056E	Int	Phase angle of Phase C voltage	0.1°	R
056F	Int	Phase angle of Phase A current	0.1°	R
0570	Int	Phase angle of Phase B current	0.1°	R
0571	Int	Phase angle of Phase C current	0.1°	R
0572	Int	Phase A voltage crest factor	0.001	R
0573	Int	Phase B voltage crest factor	0.001	R
0574	Int	Phase C voltage crest factor	0.001	R
0575	Int	Phase A current K factor	0.001	R
0576	Int	Phase B current K factor	0.001	R
0577	Int	Phase C current K factor	0.001	R

0578-057A	Int	Reserved		
057B	Int	Transformer capacity factor	0.1%	R
057C	Int	Phase A current percentage	0.1%	R
057D	Int	Phase B current percentage	0.1%	R
057E	Int	Phase C current percentage	0.1%	R
057F	Int	Load percentage	0.1%	R
0580	Int	Voltage qualified rate	0.1%	R
0581	Int	Frequency qualified rate	0.1%	R
0582	Int	Phase A voltage THD	0.01%	R
0583	Int	Phase B voltage THD	0.01%	R
0584	Int	Phase C voltage THD	0.01%	R
0585	Int	Phase A current THD	0.01%	R
0586	Int	Phase B current THD	0.01%	R
0587	Int	Phase C current THD	0.01%	R
0588	Int	Phase A voltage 2nd harmonic content	0.01%	R
0589	Int	Phase B voltage 2nd harmonic content	0.01%	R
058A	Int	Phase C voltage 2nd harmonic content	0.01%	R
058B	Int	Phase A current 2nd harmonic content	0.01%	R
058C	Int	Phase B current 2nd harmonic content	0.01%	R
058D	Int	Phase C current 2nd harmonic content	0.01%	R
058E	Int	Phase A voltage 3rd harmonic content	0.01%	R
058F	Int	Phase B voltage 3rd harmonic content	0.01%	R
0590	Int	Phase C voltage 3rd harmonic content	0.01%	R
0591	Int	Phase A current 3rd harmonic content	0.01%	R
0592	Int	Phase B current 3rd harmonic content	0.01%	R
0593	Int	Phase C current 3rd harmonic content	0.01%	R
0594	Int	Phase A voltage 4th harmonic content	0.01%	R
0595	Int	Phase B voltage 4th harmonic content	0.01%	R
0596	Int	Phase C voltage 4th harmonic content	0.01%	R

0597	Int	Phase A current 4th harmonic content	0.01%	R
0598	Int	Phase B current 4th harmonic content	0.01%	R
0599	Int	Phase C current 4th harmonic content	0.01%	R
059A	Int	Phase A voltage 5th harmonic content	0.01%	R
059B	Int	Phase B voltage 5th harmonic content	0.01%	R
059C	Int	Phase C voltage 5th harmonic content	0.01%	R
059D	Int	Phase A current 5th harmonic content	0.01%	R
059E	Int	Phase B current 5th harmonic content	0.01%	R
059F	Int	Phase C current 5th harmonic content	0.01%	R
05A0	Int	Phase A voltage 6th harmonic content	0.01%	R
05A1	Int	Phase B voltage 6th harmonic content	0.01%	R
05A2	Int	Phase C voltage 6th harmonic content	0.01%	R
05A3	Int	Phase A current 6th harmonic content	0.01%	R
05A4	Int	Phase B current 6th harmonic content	0.01%	R
05A5	Int	Phase C current 6th harmonic content	0.01%	R
05A6	Int	Phase A voltage 7th harmonic content	0.01%	R
05A7	Int	Phase B voltage 7th harmonic content	0.01%	R
05A8	Int	Phase C voltage 7th harmonic content	0.01%	R
05A9	Int	Phase A current 7th harmonic content	0.01%	R
05AA	Int	Phase B current 7th harmonic content	0.01%	R
05AB	Int	Phase C current 7th harmonic content	0.01%	R
05AC	Int	Phase A voltage 8th harmonic content	0.01%	R
05AD	Int	Phase B voltage 8th harmonic content	0.01%	R
05AE	Int	Phase C voltage 8th harmonic content	0.01%	R
05AF	Int	Phase A current 8th harmonic content	0.01%	R
05B0	Int	Phase B current 8th harmonic content	0.01%	R
05B1	Int	Phase C current 8th harmonic content	0.01%	R
05B2	Int	Phase A voltage 9th harmonic content	0.01%	R
05B3	Int	Phase B voltage 9th harmonic content	0.01%	R

05B4	Int	Phase C voltage 9th harmonic content	0.01%	R
05B5	Int	Phase A current 9th harmonic content	0.01%	R
05B6	Int	Phase B current 9th harmonic conten	0.01%	R
05B7	Int	Phase C current 9th harmonic conten	0.01%	R
05B8	Int	Phase A voltage 10th harmonic content	0.01%	R
05B9	Int	Phase B voltage 10th harmonic content	0.01%	R
05BA	Int	Phase C voltage 10th harmonic content	0.01%	R
05BB	Int	Phase A current 10th harmonic content	0.01%	R
05BC	Int	Phase B current 10th harmonic content	0.01%	R
05BD	Int	Phase C current 10th harmonic content	0.01%	R
05BE	Int	Phase A voltage 11th harmonic content	0.01%	R
05BF	Int	Phase B voltage 11th harmonic content	0.01%	R
05C0	Int	Phase C voltage 11th harmonic content	0.01%	R
05C1	Int	Phase A current 11th harmonic content	0.01%	R
05C2	Int	Phase B current 11th harmonic content	0.01%	R
05C3	Int	Phase C current 11th harmonic content	0.01%	R
...	...	...	...	...
0636	Int	Phase A voltage 31st harmonic content	0.01%	R
0637	Int	Phase B voltage 31st harmonic content	0.01%	R
0638	Int	Phase C voltage 31st harmonic content	0.01%	R
0639	Int	Phase A current 31st harmonic content	0.01%	R
063A	Int	Phase B current 31st harmonic content	0.01%	R
063B	Int	Phase C current 31st harmonic content	0.01%	R
063C-06FB	Int	32nd – 63rd harmonic content	0.01%	R
06FC-06FF	Reserved			

3.6 Manufacture information

Address	Format	Data content	Data description	R/W
0700-070F	Char	Meter model（ASCII code）		R
0710-071F	Char	Software version（ASCII code）		R
0720-073F	Int	Ua real-time waveform data (32 points)		R
0740-075F	Int	Ub real-time waveform data (32 points)		R
0760-077F	Int	Uc real-time waveform data (32 points)		R
0780-079F	Int	Ia real-time waveform data (32 points)		R
07A0-07BF	Int	Ib real-time waveform data (32 points)		R
07C0-07DF	Int	Ic real-time waveform data (32 points)		R

3.7 Event record information

Address	Format	Data content	Data description	R/W
07E0	Int	High b:yte: year; low byte: month	Power on record	R
07E1	Int	High byte: day; low byte: hour		R
07E2	Int	High byte: minute; low byte: second		R
07E3	Int	Power on times		R
07E4	Int	High b:yte: year; low byte: month	Power off record	R
07E5	Int	High byte: day; low byte: hour		
07E6	Int	High byte: minute; low byte: second		
07E7	Int	Power off times		
07E8	Int	High b:yte: year; low byte: month	Parameter modification record	R
07E9	Int	High byte: day; low byte: hour		
07EA	Int	High byte: minute; low byte: second		
07EB	Int	Parameter modification times		

07EC	Int	High b:yte: year; low byte: month	Demand reset record	R
07ED	Int	High byte: day; low byte: hour		
07EE	Int	High byte: minute; low byte: second		
07EF	Int	Demand reset times		
07F0	Int	High b:yte: year; low byte: month	Energy clearing record	R
07F1	Int	High byte: day; low byte: hour		
07F2	Int	High byte: minute; low byte: second		
07F3	Int	Energy clearing times		
07F4	Int	High byte: over-voltage record times Low byte: reserved		R
07F5	Int	High byte: under voltage record times Low byte: reserved		R
07F6	Int	High byte: over current record times Low byte: reserved		R
07F70	Int	High byte: under current record times Low byte: reserved		R
07F8	Int	High byte: over load record times Low byte: reserved		R
07F9	Int	High byte: under load record times Low byte: reserved		R
07FA	Int	High byte: SOE event record times Low byte: reserved		R
07FB	Int	High byte: voltage sag record times Low byte: reserved		R
07FC	Int	High byte: voltage swell record times Low byte: reserved		R
07FD	Int	High byte: voltage off record times Low byte: reserved		R
07FE-07EF				R

3.8 Parameter setting

Address	Format	Data content	Data description	R/W
0800	Reserved			
0801	Int	High byte: current signal type	0: input via CT 1: direct input	R
		Low byte: transformer type	0： closed type 1： open type	R
0802	Int	#1 meter address	1-247	R/W
0803	Int	#1 baud rate	0：1200bps 1：2400bps 2：4800bps 3：9600bps 4：19200bps	R/W
0804	Int	#1 check format	0：N,8,1 1：E,8,1 2：O,8,1 3：N,8,2	R/W
0805	Int	Reserved		
0806	Int	High byte: wiring mode	0：3P4W 1：3P3W 2: 1P2W	R/W
		Low byte: grid frequency	0：50Hz 1：60Hz	R/W
0807	Int	AP DO selecting	0： active energy pulse output 1： relay output	R/W
0808	Int	Voltage range setting	1～660V	R/W
0809	Int	Current range setting	1～6A	R/W
080A-080B	Long	Primary voltage setting	1～999999V	R/W
080C-080D	Long	Primary current setting	1～999999A	R/W
080E	Int	Demand item	Defaulted as Ia/Ib/Ic/P/Q/S	R
080F	Int	#1 Demand working mode	0： slip mode 1： fixed mode	R/W
0810	Int	#1 slip time（t）	1～9999s	R/W
0811	Int	#1 calculation period（T）	1～30t	R/W

0812	Int	Upper limit value of voltage qualified rate	0.1V, Secondary voltage data	R/W
0813	Int	Lower limit value of voltage qualified rate	0.1V，Secondary voltage data	R/W
0814	Int	Upper limit value of frequency qualified rate	0.01Hz	R/W
0815	Int	Lower limit value of frequency qualified rate	0.01Hz	R/W
0816	Int	#1 relay work mode	0： off 1：alarm 2： remote control 3： logic or mode 4： logic and mode	R/W
0817	Int	#1 pulse width	Pulse width：0.10～99.99s Electric level：0.00	R/W
0818	Int	#1 alarm item	0： phase voltage over voltage 1： phase voltage under voltage 2： line voltage over voltage 3： line voltage under voltage 4： over current 5： under current 6： frequency over limit 7： frequency under limit 8： total active power over load 9： total active power under load 10： total reactive power over load 11： total reactive power under load 12： total apparent power over load 13： total apparent power under load 14： high power factor 15： low power factor 16： high voltage THD 17： low voltage THD	R/W

			18： high current THD 19： low current THD 20： first digital input linkage action; digital input close, relay output act 21： first digital input linkage action; digital input open, relay output act 22： second digital input linkage action; digital input close, relay output act 23： second digital input linkage action; digital input open, relay output act	
0819	Int	#1 alarm delay time	0.0～99.99s	R/W
081A-081B	float	#1 alarm value	Numerical ratio coefficient: Voltage: V Current：A Power：kW Frequency：Hz Power factor Harmonic：0.01%	R/W
081C-081D	float	#1 hysteresis value	Numerical ratio coefficient is same as that off secondary grid data	R/W
081E-083A	Reserved			
083B	Int	Digital input delay	Unit: ms， delay time >10ms	
083C	Int	#1 digital input type	0： status monitoring 1： pulse counting	
083D	Int	#2 digital input type	0： status monitoring 1： pulse counting	
083E-083F	float	#1 digital input pulse constant	Data quantity represented by each pulse；	
0840-0841	float	#2 digital input pulse constant	Data quantity represented by each pulse；	
0842-0843	Reserved			
0844	Char	First set of time zones	#1 time zone:00h：00m(fixed)	R/W
0845	Char	First set of time zones	#2 time zone: high byte-hour, low byte-minute	R/W

0846	Char	First set of time zones	#3 time zone: high byte-hour, low byte-minute	R/W
0847	Char	First set of time zones	#4 time zone: high byte-hour, low byte-minute	R/W
0848	Char	First set of time zones	#5 time zone: high byte-hour, low byte-minute	R/W
0849	Char	First set of time zones	#6 time zone: high byte-hour, low byte-minute	R/W
084A	Char	First set of time zones	#7 time zone: high byte-hour, low byte-minute	R/W
084B	Char	First set of time zones	#8 time zone: high byte-hour, low byte-minute	R/W
084C	Char	First set of time zones	#9 time zone: high byte-hour, low byte-minute	R/W
084D	Char	First set of time zones	#10 time zone: high byte-hour, low byte-minute	R/W
084E	Char	First set of time zones	#11 time zone: high byte-hour, low byte-minute	R/W
084F	Char	First set of time zones	#12 time zone: high byte-hour, low byte-minute	R/W
0850	Char	Second set of time zones	#1 time zone:00h：00m(fixed)	R/W
0851	Char	Second set of time zones	#2 time zone: high byte-hour, low byte-minute	R/W
0852	Char	Second set of time zones	#3 time zone: high byte-hour, low byte-minute	R/W
0853	Char	Second set of time zones	#4 time zone: high byte-hour, low byte-minute	R/W
0854	Char	Second set of time zones	#5 time zone: high byte-hour, low byte-minute	R/W
0855	Char	Second set of time zones	#6 time zone: high byte-hour, low byte-minute	R/W
0856	Char	Second set of time zones	#7 time zone: high byte-hour, low byte-minute	R/W
0857	Char	Second set of time zones	#8 time zone: high byte-hour, low	R/W

			byte-minute	
0858	Char	Second set of time zones	#9 time zone: high byte-hour, low byte-minute	R/W
0859	Char	Second set of time zones	#10 time zone: high byte-hour, low byte-minute	R/W
085A	Char	Second set of time zones	#11 time zone: high byte-hour, low byte-minute	R/W
085B	Char	Second set of time zones	#12 time zone: high byte-hour, low byte-minute	R/W
085C	Char	Tariffs for first set of time zones: 0：#1 P1 1：#1 P2 2：#1 P3 3：#1 P4	High byte：tariff for #1 time zone Low byte：tariff for #2 time zone	R/W
085D	Char	Tariffs for first set of time zones	High byte：tariff for #3 time zone Low byte：tariff for #4 time zone	R/W
085E	Char	Tariffs for first set of time zones	High byte：tariff for #5 time zone Low byte：tariff for #6 time zone	R/W
085F	Char	Tariffs for first set of time zones	High byte：tariff for #7 time zone Low byte：tariff for #8 time zone	R/W
0860	Char	Tariffs for first set of time zones	High byte：tariff for #9 time zone Low byte：tariff for #10 time zone	R/W
0861	Char	Tariffs for first set of time zones	High byte：tariff for #11 time zone Low byte：tariff for #12 time zone	R/W
0862	Char	Tariffs for second set of time zones	High byte：tariff for #1 time zone Low byte：tariff for #2 time zone	R/W
0863	Char	Tariffs for second set of time zones	High byte：tariff for #3 time zone Low byte：tariff for #4 time zone	R/W
0864	Char	Tariffs for second set of time zones	High byte：tariff for #5 time zone Low byte：tariff for #6 time zone	R/W
0865	Char	Tariffs for second set of time zones	High byte：tariff for #7 time zone Low byte：tariff for #8 time zone	R/W
0866	Char	Tariffs for second set of	High byte：tariff for #9 time zone	R/W

		time zones	Low byte：tariff for #10 time zone	
0867	Char	Tariffs for second set of time zones	High byte：tariff for #11 time zone Low byte：tariff for #12 time zone	R/W
0868	Char	Selecting time zones for each month： 0： first set of time zones 1： second set of time zones	High byte：January time zones Low byte：February time zones	R/W
0869	Char	Time zones for each month	High byte： March time zones Low byte：April time zones	R/W
086A	Char	Time zones for each month	High byte：May time zones Low byte：June time zones	R/W
086B	Char	Time zones for each month	High byte：July time zones Low byte：August time zones	R/W
086C	Char	Time zones for each month	High byte：September time zones Low byte：October time zones	R/W
086D	Char	Time zones for each month	High byte：November time zones Low byte：December time zones	R/W
086E	Char	Meter reading time for each month	High byte：meter reading day Low byte：meter reading hour	R/W
086F	Reserved			
0870-0871	float	Upper limit value of voltage range	V	R/W
0872-0873	float	Hysteresis value for upper limit value of voltage range	V	R/W
0874-0875	float	Lower limit value of voltage range	V	R/W
0876-0877	float	Hysteresis value for lower limit value of voltage range	V	R/W
0878-0879	float	Upper limit value of current range	A	R/W
087A-087B	float	Hysteresis value for upper limit value of current range	A	R/W

087C-087D	float	Lower limit value of current range	A	R/W
087E-087F	float	Hysteresis value for lower limit value of current range	A	R/W
0880-0881	float	Upper limit value of power range	kW	R/W
0882-0883	float	Hysteresis value for upper limit value of power range	kW	R/W
0884-0885	float	Lower limit value of power range	kW	R/W
0886-0887	float	Hysteresis value for lower limit value of power range	kW	R/W
0888-088F	Reserved			
0890-0891	float	Voltage sag threshold value	V	R/W
0892-0893	float	Voltage sag hysteresis value	V	R/W
0894-0895	float	Voltage swell threshold value	V	R/W
0896-0897	float	Voltage swell hysteresis value	V	R/W
0898-0899	float	Voltage interruption threshold value	V	R/W
089A-089B	float	Voltage interruption hysteresis value	V	R/W