SFERE

Guide Rail Type Power Meter
Operation Manual

This manual is applied to the following models:

DDS1946
DDSF1946
DSS1946
DSSF1946
DSSD1946
DTS1946
DTSF1946
DTSD1946

JIANGSU SFERE ELECTRIC CO., LTD.

Menu

1. Introduction

1.1 Compliance with standards

IEC61557-12:2007 Electrical safety in low voltage distribution systems up to 1000 V a.c. and 1500 V d.c. -Equipment for testing, measuring or monitoring of protective measures -Part 12: Performances measuring and monitoring devices (PMD))

IEC62053-22:2003 Electricity metering equipment (a.c.)-Particular requirements-Part 22: Static meters for active energy (classes 0,2S and 0,5S)

IEC62053-23:2003 Eletricity metering equipment (a.c.)-Particular requirements-Part 23: Static meters for reactive energy (classes 2)

IEC61010-1:2001 Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements

IEC61000-4-2 Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test

IEC61000-4-3 Electromagnetic compatibility (EMC) – Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test

IEC61000-4-4 Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrical fast transient/burst immunity test

IEC61000-4-5 Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Surge immunity test

IEC61000-4-6 Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields

IEC61000-4-8 Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Power frequency magnetic field immunity test

IEC61000-4-11 Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests

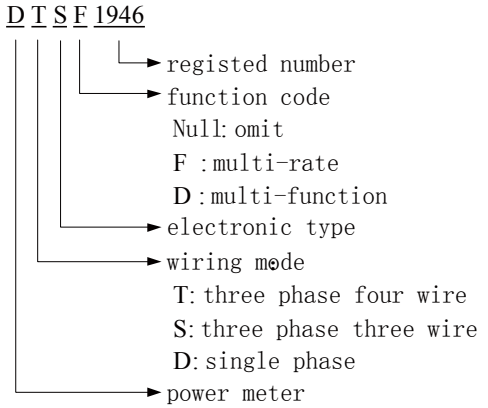
IEC61000-2-6 Electromagnetic compatibility P2: Environment section 6: Assessment of the emission levels in the power supply of industrial plants as regards low-frequency conducted disturbances

IEC60068-2-30 Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12h+12h cycle)

1.2 Production description

Guide rail type electric energy meters are designed and produced according to user's real electricity consumption situation by adopting advanced energy measurement IC and using digital sampling processing and SMT technologies. They are used to measure the real-time parameters of voltage, current, power, power factor, frequency and demand. They also have the functions such as energy measurement, SOE, pulse and communication. This series of energy meters adopt modularity structure with the features such as small volume, convenient installation and reliable working.

2.Naming rule



3.Model Selection

Function \ Model		Single phase power meter		Three phase power meter					
		DDS 1946	DDSF 1946	Three phase power meter		Three phase multi-rate power meter		Three phase multi-function power meter	
				DSS 1946	DTS 1946	DSSF 1946	DTSF 1946	DSSD 1946	DTSD 1946
Wiring mode	Single phase	√	√	-	-	-	-	-	-
	Three phase three wire	-	-	√	-	√	-	√	-
	Three phase four wire	-	-	-	√	-	√	-	√

Voltage range	220V	√	√	-	-	-	-	-	-
	3×57.5/100V	-	-	-	√	-	√	-	√
	3×220/380V	-	-	-	√	-	√	-	√
	3×100V	-	-	√	-	√	-	√	-
	3×380V	-	-	√	-	√	-	√	-
Current specification	Direct input	5(30)A, 10(60)A		5(100)A					
	Input via CT	1.5(6)A							
Real-time measurement	Voltage & current	√	√	√	√	√	√	√	√
	Power	√	√	√	√	√	√	√	√
	Power factor	√	√	√	√	√	√	√	√
	Frequency	√	√	√	√	√	√	√	√
	THD	-	-	√	√	√	√	√	√
Energy metering	Bi-directional energy	√	√	√	√	√	√	√	√
	Four-quadrant energy	-	-	-	-	-	-	√	√
	Multi-rate energy	-	√	-	-	√	√	√	√
Demand		-	-	-	-	-	-	√	√
Events record		-	-	-	-	-	-	√	√
Communication interface	RS485	○	○	○	○	○	○	○	○
Energy pulse		√	√	√	√	√	√	√	√
Display mode		LCD	LCD	LCD	LCD	LCD	LCD	LCD	LCD

Note: in the upper format, √ means the function is available; - means the function is not available; ○ means the function is optional.

4.Technical index

Electrical feature				
Function \ Model		DDS1946 DDS1946-T DDSF1946	DSS1946 DSSF1946 DSSD1946	DTS1946 DTS1946-T DTSF1946 DTSD1946
Accuracy		voltage, current：Class 1 power active energy：Class 1		
Rated voltage		220V	3×380V	3×220/380V
Input current	Direct input	5(30)A，10(60)A	5(100)A	
	Input via CT	1.5(6)A		
Frequency		50/60 Hz		
Wiring mode		Single phase	three phase three wire	three phase four wire
Voltage range		0.8Un ～ 1.2Un		
Consumption	voltage circuit consumption	< 5VA		
	current circuit consumption	< 2VA		
Start current	direct input	0.004Ib		
	input via CT	0.002In		
Energy pulse		one active energy optoelectronic isolation output, pulse width （80±20%）ms		
Time error		≤0.5s		
Communication feature				
RS485 communication interface		Modbus-RTU protocol(optional)，baud rate up to 9600bps DL/T 645 communication protocol (optional)，baud rate up to 9600bps		
Mechanical feature				
Dimension		72×90×63.5	126×90×63.5	
IP protection		IP54（panel）/IP20（case）		

Environment feature	
Work temperature	(-10～55)℃
Storage temperature	(-25～70)℃
Relative humidity	(5～95)%（no condensation）
EMC	
Electrostatic discharge immunity	IEC 61000-4-2-III class
Radiated, radio-frequency, electromagnetic field immunity	IEC 61000-4-3-III class
Electrical fast transient/burst immunity test	IEC 61000-4-4-Ⅳ class
Surge immunity	IEC 61000-4-5-Ⅳ class
Immunity to conducted disturbances, induced by radio-frequency fields	IEC 61000-4-6-III class
Power frequency magnetic field immunity	IEC 61000-4-8-III class
Voltage dips, short interruptions and voltage variations immunity	IEC 61000-4-11-III class

5.Function characteristics

5.1 Parameter measurement

Real-time measurement of the following parameters：

- Voltage, current
- Power, power factor
- Frequency
- Demand

5.2 Energy metering

Energy metering function supported by the meter

- Bi-directional energy metering;

- Multi-rate energy metering;
- Four-quadrant reactive energy;

The meter has a set of twelve time ranges with four kinds of rates. User can divide twenty four hours a day into twelve times ranges and select a rate from four kinds of rates which are tip, peak, level and valley. User also can set automatic meter reading time. The meter can record the energy information of latest three months, for example, total active energy of this month, total tip active energy of last month and total level active energy of the month before last.

5.4 Events recording

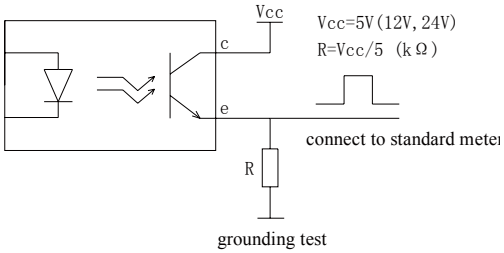
The meter has events recording function. It can record its power on times, the latest power on time, programming times, the latest programming time, energy clearing times and the latest energy clearing time.

5.5 Communication function

- RS485 interface is isolated from the inside of the meter, and there is lightening protection circuit in the meter.
- Realize RS485 communication through PC to do programming, setting and meter reading.
- Communication protocol is defaulted to be Modbus-RTU. User can change it to be DL/T645-1997 by pressing buttons.

5.6 Energy pulse

This meter provides active energy pulse output and adopts open optical collector mode to realize the remote transmission of active energy. Remote computer terminal, PLC and switch signal acquisition module to collect the accumulation of energy.

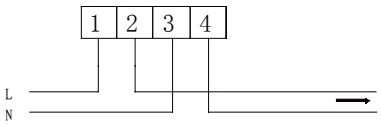


Energy pulse testing diagram

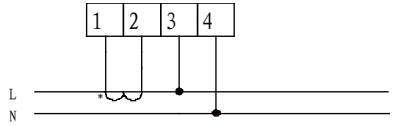
6. Installation and wiring

6.1 Wiring mode

Single phase meter

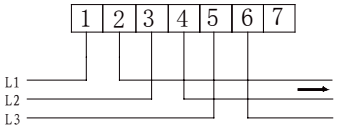


single phase direct connection

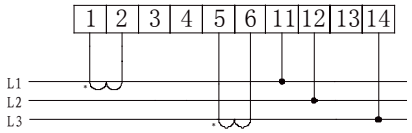


single phase connection via CT

Three phase three wire

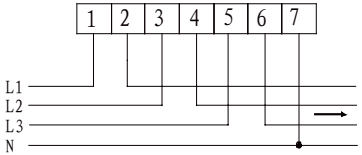


three phase three wire
direct connection

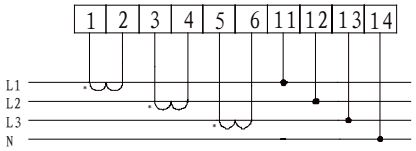


three phase three wire
connection via CT

Three phase four wire

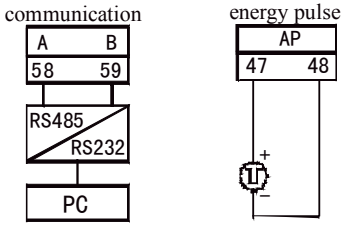


three phase four wire
direct connection



three phase four wire
connection via CT

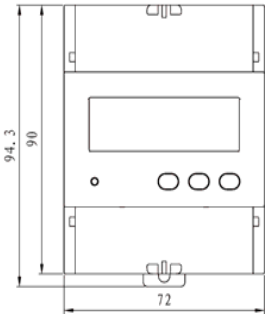
Signal terminal wiring diagram



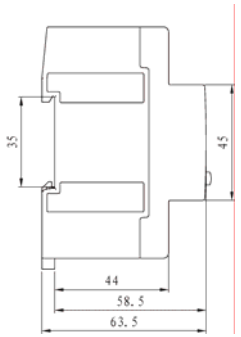
6.2 Outline dimension

Single phase meter outline dimension (mm)

front view

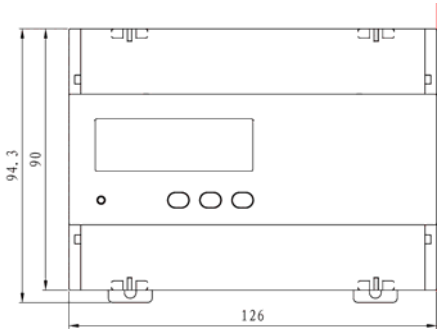


side view

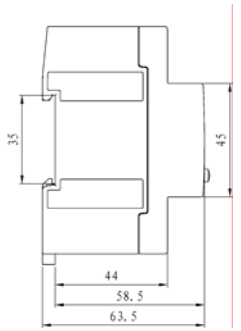


Three phase meter outline dimension (mm)

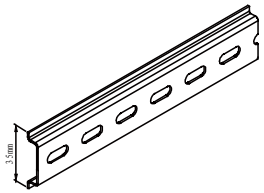
front view

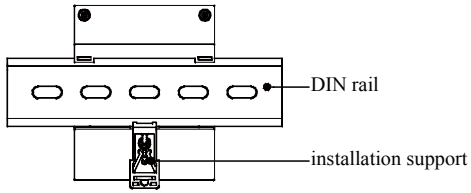


side view



6.3 Installation method

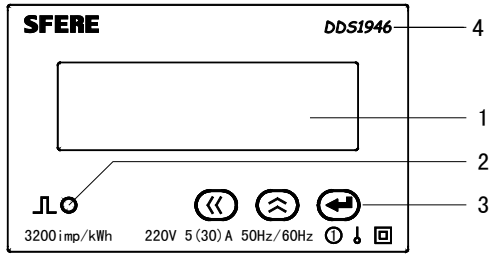




7. Operation

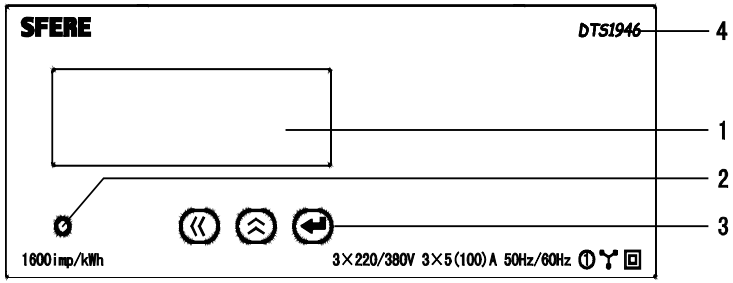
7.1 Panel description

7.1.1 Single phase guide rail type electric energy meter panel



1：Display interface　2：Energy pulse indication light　3：Buttons　4:Model

7.1.2 Three phase guide rail type electric energy meter panel

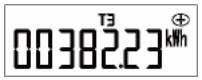


1：Display interface　2：Energy pulse indication light　3：Buttons　4: Model

7.2 Display

Guide rail type electric energy meter shows the measured data of voltage, current, power, power factor, frequency and electric energy. Press ⟨⟨ and ⩔ buttons at the same time to switch between electric energy interface and electric quantity interface.

Electric energy display interfaces

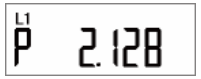
Display interface	Description
	Import active electric energy： EP =780.62 kWh
	Export active electric energy： EP- = 0.00 kWh
	Import reactive electric energy： EQ = 18.80 kvarh
	Export reactive electric energy： EQ- = 7.10 kvarh
	Total multi-rate energy (tip) 208.09 kWh
	Total multi-rate energy (peak) 101.06 kWh
	Total multi-rate energy (level) 382.23 kWh
	Total multi-rate energy (valley) 89.24 kWh

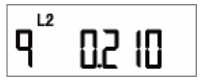
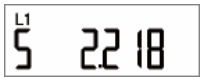
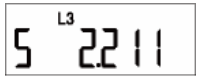
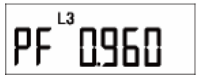
Electric quantity display interface of single phase meter：

Display interface	Description
	Voltage： U = 220.0 V
	Current： I = 35.00 A
	Active power： P = 7.700 kW
	Reactive power： Q = -0.006 kW
	Apparent power S = 7.700 kVA

	Power factor PF = 1.000
	Frequency F = 50.00Hz

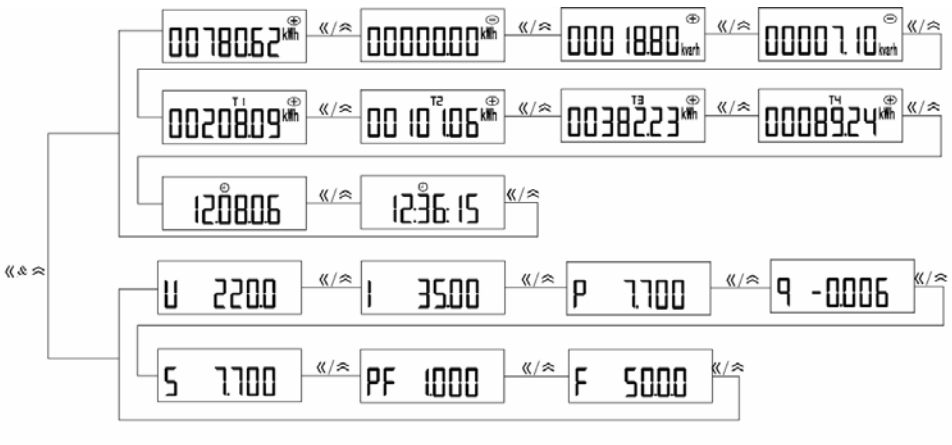
Electric quantity interface of three phase meter (e.g. three phase four wire mode)

Display interface	Description
	Phase voltage Ua Ua = 220.1 V
	Phase voltage Ub Ub = 220.2 V
	Phase voltage Uc Uc = 220.0 V
	Line voltage Uab Uab = 381.3V
	Line voltage Ubc Ubc = 381.2 V
	Line voltage Uca Uca = 381.2 V
	Phase A current Ia = 10.10A
	Phase B current Ib = 10.20A
	Phase C current Ic = 11.00A
	Phase A active power Pa = 2.128 kW
	Phase B active power Pb = 2.040 kW
	Phase C active power Pc = 2.100 kW

	Total active power P = 6.267 kW
	Phase A reactive power Qa = 0.108 kvar
	Phase B reactive power Qb = 0.210 kvar
	Phase C reactive power Qc = 0.098 kvar
	Total reactive power Q = 0.416 kvar
	Phase A apparent power Sa = 2.218 kVA
	Phase B apparent power Sb = 2.207 kVA
	Phase C apparent power Sc = 2.211 kVA
	Total apparent power S = 6.636 kVA
	Phase A power factor PFa = 0.998
	Phase B power factor PFb = 0.980
	Phase C power factor PFc = 0.960
	Total power factor PF = .979
	Grid frequency F = 50.00 Hz
	Time: year-month-day 2012, August 6th

12:36:15	Time: hour-minute-second 12: 36: 15

Display interfaces



8.Setting

Enter programming mode

Keep pressing ⟨⟨ and ⩓ buttons for more than 3 seconds in electric energy display interface until CodE appears. Then press ⟨⟨ or ⩓ button to input password (defaulted as 0000). After inputting correct password, press ↵ button to enter setting interface.

Exit programming mode

After changing the data of items of third level menu, press ↵ button to confirm the modification. If user wants to cancel the modification, please press ⟨⟨ and ⩓ buttons at the same time. After confirm or cancel the modification, press ⟨⟨ and ⩓ buttons to return to first level menu. Now press ⟨⟨ and ⩓ buttons again, no appears. There are two choices at this situation:

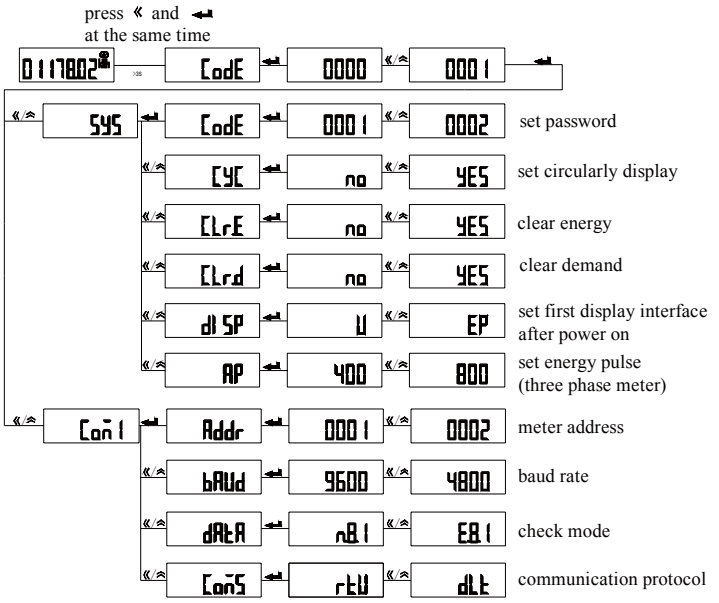
1）Press ↵ button not to save setting parameters;

2）Press ↵ ⟨⟨ and ⩓ buttons to select YES, then press ↵ button to save setting parameters.

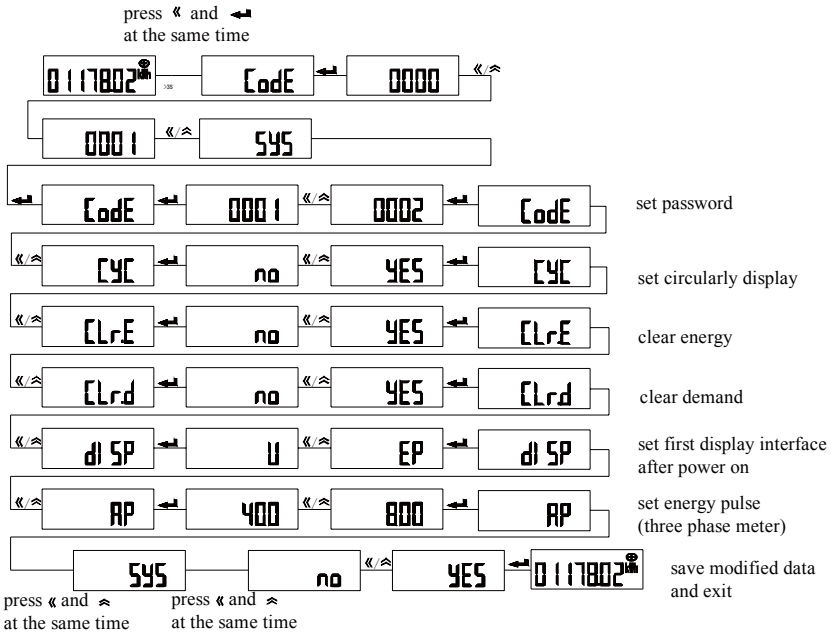
In parameter setting operation, ⟨⟨ button is used to switch between menus and select numbers at different bits, ⩓ button is used to switch between menus and change the number at

same bit, ⟨⟨ and ⩓ buttons are used as combined buttons for returning to upper level menu or canceling modification, ↵ button is used to enter next level menu or confirm modification.

Setting menu

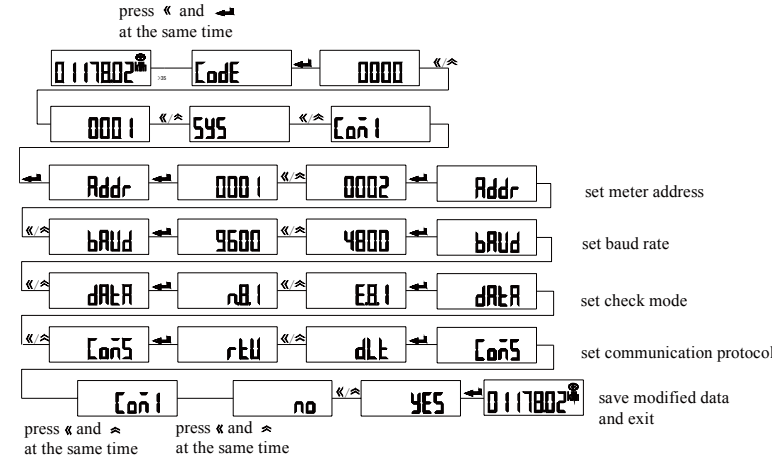


System parameter setting menu



Communication setting

Set communication address as 2, select baud rate 4800bps, set check mode E.8.1, and choose DLT645 communication protocol.



9. Modbus-RTU communication

Modbus-RTU communication protocol message format

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 example	0x01	0x03	0x00 0x00	0x00 0x06	0xC5 0xC8
	frame structure	address code	function code	data code		CRC check code
Slave response				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:

Remark: the initial register address in host inquiry is the initial address of the data collected from power grid. The number of register indicates the length of the data. In the upper list the register address "0x00 0x00" 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 6 (three float data occupies six registers). Please refer to appendix 1 MODBUS-RTU communication address information table.

Write setting register value（function code 0x10）

host request	frame structure	address code	function code	data code				CRC check code
				initial relay address	relay length	relay byte	written value	
	byte	1 byte	1 byte	2 bytes	2 bytes	1 byte	2N bytes	2 byte
	data range	1～247	0x10	0x0802	0x0001	N		CRC16
	message example	0x01	0x10	0x08 0x02	0x00 0x01	0x02	0x01 0x00	0x2FE2
slave	frame	address	functi	data code				CRC

respo nse	structure	code	on code	initial relay address	relay length	check code
	byte	1 byte	1 byte	2 bytes	2 bytes	2 bytes
	message example	0x01	0x10	0x08 0x02	0x00 0x01	0xA269

Remark:

Please strictly follow the Meter setting information address list in appendix when writing setting register. Do not change the reserved data. Written data should not exceed set range. Wrong operation may cause meter damaged.

10. DL/T 645 communication protocol

10.1 Single phase meter DL/T 645-1997 communication protocol

10.1.1 Energy communication protocol

Code	Data format	Length	Unit	Read	Write	Data item name
9010	XXXXXX.XX	4	kWh	*		import active energy [total]
9011	XXXXXX.XX	4	kWh	*		import active energy [tip]
9012	XXXXXX.XX	4	kWh	*		import active energy [peak]
9013	XXXXXX.XX	4	kWh	*		import active energy [level]
9014	XXXXXX.XX	4	kWh	*		import active energy [valley]
901F		20	kWh	*		import active energy data packet
9020	XXXXXX.XX	4	kWh	*		export active energy
9110	XXXXXX.XX	4	kvarh	*		import reactive energy
9120	XXXXXX.XX	4	kvarh	*		export reactive energy
9130	XXXXXX.XX	4	kvarh	*		first quadrant reactive energy
9140	XXXXXX.XX	4	kvarh	*		fourth quadrant reactive energy
9150	XXXXXX.XX	4	kvarh	*		second quadrant reactive energy
9160	XXXXXX.XX	4	kvarh	*		third quadrant reactive energy
9410	XXXXXX.XX	4	kWh	*		active energy of last month [total]
9411	XXXXXX.XX	4	kWh	*		active energy of last month [tip]
9412	XXXXXX.XX	4	kWh	*		energy of last month [peak]
9413	XXXXXX.XX	4	kWh	*		energy of last month [level]
9414	XXXXXX.XX	4	kWh	*		energy of last month [valley]
941F		20	kWh	*		active energy data packet of last month
9810	XXXXXX.XX	4	kWh	*		active energy of the month before last [total]
9811	XXXXXX.XX	4	kWh	*		active energy of the month before last [tip]
9812	XXXXXX.XX	4	kWh	*		active energy of the month before last [peak]
9813	XXXXXX.XX	4	kWh	*		active energy of the month before last [level]
9814	XXXXXX.XX	4	kWh	*		active energy of the month before last [valley]
981F		20	kWh	*		active energy data packet of the month before last
9FFF		88	kWh	*		active energy data packet of all above

10.1.2 Instantaneous power communication protocol

Code	Data format	Length	Unit	Read	Write	Data item name
B611	XXXX	2	V	*		voltage
B621	XX.XX	2	A	*		current
B630	XX.XXXX	3	kW	*		active power
B640	XX.XX	2	kvar	*		total reactive power
B650	X.XXX	2	0.001	*		total power factor
B660	XX.XX	2	kVA	*		total apparent power
B680	XX.XX	2	Hz	*		frequency
B6FF	-	15	-	*		Data packet of instantaneous power

10.1.3 Communication parameter protocol

Code	Data format	Lengtn	Unit	Read	Write	Data item name	
C010	YYMMDDWW	4	year/month/day /week	*	*	date and week order	These codes are not effective if there is no multi-rate function.
C011	hhmmss	3	hour/minute/second	*	*	time	
C117	DDhh	2	day/hour	*	*	automatic meter reading date	
C023	XX	1		*		Meter running state 2(see noting)	
C030	NNNNNN	3	imp/kWh	*	*	Active pulse constant	
C031	NNNNNN	3	imp/kvarh	*	*	Reactive pulse constant	
C032	NNNNNNNNNNNN	6		*	*	Meter number(meter number is smaller than 247)	
C331	hhmmNN	3	hour/minute/rate	*	*	first time zone (starting time is defaulted to be 00:00)	These codes are not effective if there is no multi-rate function.
C332	hhmmNN	3	hour/minute/rate	*	*	second time zone	
C333	hhmmNN	3	hour/minute/rate	*	*	third time zone	
…	…	3	…	*	*	… …	
C33B	hhmmNN	3	hour/minute/rate	*	*	eleventh time zone	
C33C	hhmmNN	42	hour/minute/rate	*	*	twelfth time zone	

Remark：

① Writing meter address, changing communication speed and radio time calibration all follow DL/T645-1997 multi-function power meter communication protocol.

② When changing communication parameters, please add 1 Byte (authority)+3 Byte (password) to the code. The defaulted authority and password are 00000000.

③ Meter running state 2 [C023](1：export，0：import)

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Total reactive	--	--	--	Total active	--	--	--

10.2 Three phase meter DL/T 645-1997 communication protocol

10.2.1. Energy communication protocol

Code	Data format	Length	Unit	Read	Write	Data item name
9010	XXXXXX.XX	4	kWh	*		Import active energy [total]
9011	XXXXXX.XX	4	kWh	*		Import active energy [top]
9012	XXXXXX.XX	4	kWh	*		Import active energy [peak]
9013	XXXXXX.XX	4	kWh	*		Import active energy [level]
9014	XXXXXX.XX	4	kWh	*		Import active energy [valley]
901F		20	kWh	*		Import active energy data packet
9020	XXXXXX.XX	4	kWh	*		Export active energy
9110	XXXXXX.XX	4	kvarh	*		Import reactive energy
9120	XXXXXX.XX	4	kvarh	*		Export reactive energy
9130	XXXXXX.XX	4	kvarh	*		first quadrant reactive energy
9140	XXXXXX.XX	4	kvarh	*		fourth quadrant reactive energy
9150	XXXXXX.XX	4	kvarh	*		second quadrant reactive energy
9160	XXXXXX.XX	4	kvarh	*		third quadrant reactive energy
9410	XXXXXX.XX	4	kWh	*		active energy of last month [total]
9411	XXXXXX.XX	4	kWh	*		active energy of last month [tip]
9412	XXXXXX.XX	4	kWh	*		active energy of last month [peak]
9413	XXXXXX.XX	4	kWh	*		active energy of last month [level]
9414	XXXXXX.XX	4	kWh	*		active energy of last month [valley]
941F		20	kWh	*		active energy data packet of last month
9810	XXXXXX.XX	4	kWh	*		active energy of the month before last [total]
9811	XXXXXX.XX	4	kWh	*		active energy of the month before last [tip]
9812	XXXXXX.XX	4	kWh	*		active energy of the month before last [peak]

9813	XXXXXX.XX	4	kWh	*		active energy of the month before last [level]
9814	XXXXXX.XX	4	kWh	*		active energy of the month before last [valley]
981F		20	kWh	*		active energy data packet of the month before last
9FFF		88	kWh	*		energy data packet of all above

10.2.2. Instantaneous power communication protocol

Code	Data format	Length	Unit	Read	Write	Data item name
B611	XXXX	2	V	*		Phase A voltage
B612	XXXX	2	V	*		Phase B voltage
B613	XXXX	2	V	*		Phase C voltage
B61F		6	V	*		Phase voltage data packet
B691	XXXX	2	V	*		AB line voltage
B692	XXXX	2	V	*		BC line voltage
B693	XXXX	2	V	*		CA line voltage
B69F		6	V	*		Line voltage data packet
B621	XX.XX	2	A	*		Phase A current
B622	XX.XX	2	A	*		Phase B current
B623	XX.XX	2	A	*		Phase C current
B62F		6	A	*		Current data packet
B630	XX.XXXX	3	kW	*		Total active power
B631	XX.XXXX	3	kW	*		Phase A active power
B632	XX.XXXX	3	kW	*		Phase B active power
B633	XX.XXXX	3	kW	*		Phase C active power
B63F		12	kW	*		active power data packet
B640	XX.XX	2	kvar	*		total reactive power
B641	XX.XX	2	kvar	*		Phase A reactive power
B642	XX.XX	2	kvar	*		Phase B reactive power

B643	XX.XX	2	kvar	*		Phase C reactive power
B64F		8	kvar	*		reactive power data packet
B650	X.XXX	2	0.001	*		total power factor
B651	X.XXX	2	0.001	*		Phase A power factor
B652	X.XXX	2	0.001	*		Phase B power factor
B653	X.XXX	2	0.001	*		Phase C power factor
B65F		8	0.001	*		power factor data packet
B660	XX.XX	2	kVA	*		total apparent power
B661	XX.XX	2	kVA	*		Phase A apparent power
B662	XX.XX	2	kVA	*		Phase B apparent power
B663	XX.XX	2	kVA	*		Phase C apparent power
B66F		8	kVA	*		apparent power data packet
B680	XX.XX	2	Hz	*		frequency
B6FF	-	56	-	*		instantaneous power data packet

10.2.3. Total harmonic distortion (THD) communication protocol

Code	Data format	Length	Unit	Read	Write	Data item name
B711	XX.XX	2	0.01%	*		Phase A voltage THD
B712	XX.XX	2	0.01%	*		Phase B voltage THD
B713	XX.XX	2	0.01%	*		Phase C voltage THD
B714	XX.XX	2	0.01%	*		Phase A current THD
B715	XX.XX	2	0.01%	*		Phase B current THD
B716	XX.XX	2	0.01%	*		Phase C current THD
B71F		12	0.01%	*		THD data packet

10.2.4 Communication parameter protocol

Code	Data format	Length	Unit	Read	Write	Data item name	
C010	YYMMDDWW	4	year/month/day	*	*	date and week	These codes are

			/week			order	not effective if there is no multi-rate function.
C011	hhmmss	3	hour/minute/second	*	*	time	
C117	DDhh	2	day/hour	*	*	automatic meter reading date	
C023	XX	1		*		meter running state 2(see remark)	
C030	NNNNNN	3	imp/kWh	*	*	active energy pulse constant	
C031	NNNNNN	3	imp/kvarh	*	*	reactive energy pulse constant	
C032	NNNNNNNNNNNN	6		*	*	meter number (meter number is smaller than 247)	
C331	hhmmNN	3	hour/minute/rate	*	*	first time zone (starting time is defaulted to be 00:00)	These codes are not effective if there is no multi-rate function.
C332	hhmmNN	3	hour/minute/rate	*	*	second time zone	
C333	hhmmNN	3	hour/minute/rate	*	*	third time zone	
…	…	3	…	*	*	… …	
C33B	hhmmNN	3	hour/minute/rate	*	*	eleventh time zone	
C33C	hhmmNN	42	hour/minute/rate	*	*	twelfth time zone	

Read：

① Writing meter address, changing communication speed and radio time calibration all follow DL/T645-1997 multi-function power meter communication protocol.。

② When changing communication parameters, please add 1 Byte (authority)+3 Byte (password) to the code. The defaulted authority and password are 00000000.

③ Meter running state 2 [C023](1：export，0：import)

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
total reactive	--	--	--	total active	--	--	--

10.3 Single phase meter DL/T 645-2007 communication protocol

10.3.1 电能通信协议 Energy communication protocol

Code	Data format	Length	Unit	Read	Write	Data item name
00010000	XXXXXX.XX	4	kWh	*		Import active energy [total]
	XXXXXX.XX	4	kWh	*		Import active energy [tip]
	XXXXXX.XX	4	kWh	*		Import active energy [peak]
	XXXXXX.XX	4	kWh	*		Import active energy [level]
	XXXXXX.XX	4	kWh	*		Import active energy [valley]
0001ff00		20	kWh	*		import active energy data packet
00020000	XXXXXX.XX	4	kWh	*		export active energy
00030000	XXXXXX.XX	4	kvarh	*		import reactive energy
00040000	XXXXXX.XX	4	kvarh	*		export reactive energy
00050000	XXXXXX.XX	4	kvarh	*		first quadrant reactive energy
00060000	XXXXXX.XX	4	kvarh	*		second quadrant reactive energy
00070000	XXXXXX.XX	4	kvarh	*		third quadrant reactive energy
00080000	XXXXXX.XX	4	kvarh	*		fourth quadrant reactive energy
	XXXXXX.XX	4	kWh	*		active energy of last month [total]
	XXXXXX.XX	4	kWh	*		active energy of last month [tip]
	XXXXXX.XX	4	kWh	*		active energy of last month [peak]
	XXXXXX.XX	4	kWh	*		active energy of last month [level]
	XXXXXX.XX	4	kWh	*		active energy of last month [valley]
0001ff01		20	kWh	*		active energy data packet of last month
	XXXXXX.XX	4	kWh	*		active energy of the month before last [总 total]
	XXXXXX.XX	4	kWh	*		active energy of the month before last [tip]
	XXXXXX.XX	4	kWh	*		active energy of the month before last [peak]
	XXXXXX.XX	4	kWh	*		active energy of the month before last [level]
	XXXXXX.XX	4	kWh	*		active energy of the month

						before last [valley]
0001ff02		20	kWh	*		active energy data packet of the month before last

10.3.2 Instantaneous power communication protocol

Code	Data format	Length	Unit	Read	Write	Data item name
02010100	XXX.X	2	V	*		voltage
02020100	XXX.XXX	3	A	*		current
02030000	XX.XXXX	3	kW	*		active power
02040000	XX.XXXX	3	kvar	*		reactive power
02060000	X.XXX	2	0.001	*		power factor
02050000	XX.XXXX	3	kVA	*		apparent power
02800002	XX.XX	2	Hz	*		frequency

10.3.3 Communication parameter protocol

Code	Data format	Length	Unit	Read	Write	Data item name	
04000101	YYMMDDWW	4	year/month/day/week	*	*	date and week order	These codes are not effective if there is no multi-rate function.
04000102	hhmmss	3	hour/minute/second	*	*	time	
04000b01	DDhh	2	day/hour	*	*	automatic meter reading date	
04000502	XXXX	2		*		meter running state 2(see remark)	
04000409	NNNNNN	3	imp/kWh	*		active energy pulse constant	
0400040a	NNNNNN	3	imp/kvarh	*		reactive energy pulse constant	
04000401	NNNNNNNNNNNN	6		*	*	communication address (smaller than 247)	
04010001 (up to 36 个 byte)	hhmmNN	3	hour/minute/rate	*	*	first time zone (starting time is defaulted to be 00:00)	These codes are not effective if there is
	hhmmNN	3	hour/minute/rate	*	*	second time zone	
	hhmmNN	3	hour/minute/rate	*	*	third time zone	no multi-rate function.
	…	3	…	*	*	… …	
	hhmmNN	3	hour/minute/rate	*	*	eleventh time zone	
	hhmmNN	42	hour/minute/rate	*	*	twelfth time zone	

Remark：

① Writing communication address and radio time calibration follow DL/T645-1997 multi-function power meter communication protocol.

② When changing communication parameters, please add 4 Bytes (password)+4 Bytes (operation code) to the code. The defaulted authority and password are 0101010102020202.

③ Meter running state 2 [04000502](1：export，0：import)

Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
omit	omit	omit	omit	omit	omit	omit	omit
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
reactive	omit	omit	omit	active	omit	omit	omit

10.4 Three phase DL/T 645-2007 communication protocol

10.4.1.Energy communication protocol

Code	Data format	Length	Unit	Read	Write	Data item name
00010000	XXXXXX.XX	4	kWh	*		import active energy [total]
	XXXXXX.XX	4	kWh	*		import active energy [tip]
	XXXXXX.XX	4	kWh	*		import active energy [peak]
	XXXXXX.XX	4	kWh	*		import active energy [level]
	XXXXXX.XX	4	kWh	*		import active energy [valley]
0001ff00		20	kWh	*		import active energy data socket
00020000	XXXXXX.XX	4	kWh	*		export active energy
00030000	XXXXXX.XX	4	kvarh	*		import reactive energy
00040000	XXXXXX.XX	4	kvarh	*		export reactive energy
00050000	XXXXXX.XX	4	kvarh	*		first quadrant reactive energy

00060000	XXXXXX.XX	4	kvarh	*		second quadrant reactive energy
00070000	XXXXXX.XX	4	kvarh	*		third quadrant reactive energy
00080000	XXXXXX.XX	4	kvarh	*		fourth quadrant reactive energy
	XXXXXX.XX	4	kWh	*		active energy of last month [total]
	XXXXXX.XX	4	kWh	*		active energy of last month [tip]
	XXXXXX.XX	4	kWh	*		active energy of last month [peak]
	XXXXXX.XX	4	kWh	*		active energy of last month [level]
	XXXXXX.XX	4	kWh	*		active energy of last month [valley]
0001ff01		20	kWh	*		active energy data packet of last month
	XXXXXX.XX	4	kWh	*		active energy of the month before last [total]
	XXXXXX.XX	4	kWh	*		active energy of the month before last [tip]
	XXXXXX.XX	4	kWh	*		active energy of the month before last [peak]
	XXXXXX.XX	4	kWh	*		active energy of the month before last [level]
	XXXXXX.XX	4	kWh	*		active energy of the month before last [valley]
0001ff02		20	kWh	*		active energy data packet of the month before last

10.4.2. Instantaneous power communication protocol

Code	Data format	Length	Unit	Read	Write	Data item name
02010100	XXX.X	2	V	*		Phase A voltage
02010200	XXX.X	2	V	*		Phase B voltage

02010300	XXX.X	2	V	*		Phase C voltage
0201ff00		6	V	*		Phase voltage data socket
	XXXX	2	V	*		AB line voltage
	XXXX	2	V	*		BC line voltage
	XXXX	2	V	*		CA line voltage
020cff00		6	V	*		Line voltage data packet
02020100	XXX.XXX	3	A	*		Phase A current
02020200	XXX.XXX	3	A	*		Phase B current
02020300	XXX.XXX	3	A	*		Phase C current
0202ff00		9	A	*		current data packet
02030000	XX.XXXX	3	kW	*		total active power
02030100	XX.XXXX	3	kW	*		Phase A active power
02030200	XX.XXXX	3	kW	*		Phase B active power
02030300	XX.XXXX	3	kW	*		Phase C active power
0203ff00		12	kW	*		active power data packet
02040000	XX.XXXX	3	kvar	*		total reactive power
02040100	XX.XXXX	3	kvar	*		Phase A reactive power
02040200	XX.XXXX	3	kvar	*		Phase B reactive power
02040300	XX.XXXX	3	kvar	*		Phase C reactive power
0204ff00		12	kvar	*		reactive power data packet
02060000	X.XXX	2	0.001	*		total power factor
02060100	X.XXX	2	0.001	*		Phase A power factor
02060200	X.XXX	2	0.001	*		Phase B power factor
02060300	X.XXX	2	0.001	*		Phase C power factor
0206ff00		8	0.001	*		power factor data packet
02050000	XX.XXXX	3	kVA	*		total apparent power
02050100	XX.XXXX	3	kVA	*		Phase A apparent power
02050200	XX.XXXX	3	kVA	*		Phase B apparent power
02050300	XX.XXXX	3	kVA	*		Phase C apparent power
0205ff00		12	kVA	*		apparent power data packet

02800002	XX.XX	2	Hz	*		frequency

10.4.3 Total harmonic distortion (THD) communication protocol

Code	Data format	Length	Unit	Read	Write	Data item name
02080100	XX.XX	2	0.01%	*		Phase A voltage THD
02080200	XX.XX	2	0.01%	*		Phase B voltage THD
02080300	XX.XX	2	0.01%	*		Phase C voltage THD
0208ff00		6	0.01%	*		Three phase voltage THD data packet
02090100	XX.XX	2	0.01%	*		Phase A current THD
02090200	XX.XX	2	0.01%	*		Phase B current THD
02090300	XX.XX	2	0.01%	*		Phase C current THD
0209ff00		6	0.01%	*		Three phase current THD data packet

10.4.4. Demand metering

Code	Data format	Length	Unit	Read	Write	Data item name
	XXX.X	2	0.1V	*		Max. phase voltage value of this month
	XXX.X	2	0.1V	*		Max. line voltage value of this month
	XXX.XXX	3	1mA	*		Max. current value of this month
	XX.XXXX	3	1kW	*		Max. active power value of this month
	XX.XXXX	3	1kvar	*		Max. reactive power value of this month
	XX.XXXX	3	1kVA	*		Max. apparent power value of this month
	XX.XXXX	3	1kW	*		Max. active demand value of this month
	XX.XXXX	3	1kvar	*		Max. reactive demand value of this month
	XX.XXXX	3	1kVA	*		Max. apparent demand value

						of this month
0101ff00		25				Max. value and max. demand data packet of this month
	XXX.X	2	0.1V	*		Max. phase voltage value
	XXX.X	2	0.1V	*		Max. line voltage value
	XXX.XXX	3	1mA	*		Max. current value
	XX.XXXX	3	1kW	*		Max. active power value
	XX.XXXX	3	1kvar	*		Max. reactive power value
	XX.XXXX	3	1kVA	*		Max. apparent power value
	XX.XXXX	3	1kW	*		Max. active demand value
	XX.XXXX	3	1kvar	*		Max. reactive demand value
	XX.XXXX	3	1kVA	*		Max. apparent demand value
0101ff01		25				Max. value and max. demand data packet

10.4.5 Communication parameter protocol

Code	Data format	Length	Unit	Read	Write	Data item name	
04000101	YYMMDDWW	4	year/month/day/week	*	*	date and week order	These codes are not effective if there is no multi-rate function.
04000102	hhmmss	3	hour/minute/second	*	*	time	
04000b01	DDhh	2	day/hour	*	*	automatic meter reading date	
04000502	XXXX	2		*		meter running state 2(see remark)	
04000409	NNNNNN	3	imp/kWh	*		active energy pulse constant	
0400040a	NNNNNN	3	imp/kvarh	*		reactive energy pulse constant	
04000401	NNNNNNNNNNNN	6		*	*	communication address (smaller than 247)	
04010001 (up to 36 个 byte)	hhmmNN	3	hour/minute/rate	*	*	first time zone (starting time is defaulted to be00:00)	These codes are not effective if there is no
	hhmmNN	3	hour/minute/rate	*	*	second time zone	
	hhmmNN	3	hour/minute/rat	*	*	third time zone	

		e				multi-rate function.
…	3	…	*	*	……	
hhmmNN	3	hour/minute/rate	*	*	eleventh time zone	
hhmmNN	42	hour/minute/rate	*	*	twelfth time zone	

Remark：

① Writing meter address and radio time calibration all follow DL/T645-1997 multi-function power meter communication protocol.。

② When changing communication parameters, please add 4 Bytes (password)+4 Bytes (operation code) to the code. The defaulted authority and password are 0101010102020202.

③ Meter running state 2 [04000502](1：export，0：import)

Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
omit	omit	omit	omit	omit	omit	omit	omit
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
total reactive	Phase C reactive	Phase B reactive	Phase A reactive	total active	Phase C active	Phase B active	Phase A active

Appendix 1 MODBUS-RTU communication address information list (single phase meter)

0x03/0x04 command data register address:

Address	Format	Data description	Unit	R/W
float type data				
0000-0001	float	voltage	V	R
0002-0003	float	current	A	R
0004-0005	float	active power	kW	R
0006-0007	float	reactive power	kvar	R
0008-0009	float	apparent power	kVA	R
000A-000B	float	power factor		R
000C-000D	Float	frequency	1Hz	
000E-000F	float	import active energy	kWh	R
0010-0011	float	export active energy	kWh	R
0012-0013	float	import reactive energy	kvarh	R

0014-0015	float	export reactive energy	kvarh	R
0016-00FF	---			
time data				
0100	Char	time	year-month	R
0101	Char	time	day-hour	R
0102	Char	time	minute-second	R
0103	Char	time	week-reserved	R
0104-0105	---			
Energy data				
0106-0107	Long	import active energy	10Wh	R
0108-0109	Long	export active enregy	10Wh	R
010A-010B	Long	import reactive energy	10varh	R
010C-010D	Long	export reactive energy	10varh	R
010E-010F	Long	apparent energy	10VAh	R
0110-0111	Long	first quadrant reactive energy	10varh	R
0112-0113	Long	second quadrant reactive energy	10varh	R
0114-0115	Long	third quadrant reactive energy	10varh	R
0116-0117	Long	fourth quadrant reactive energy	10varh	R
0118-0119	Long	active energy [total]	10Wh	R
011A-011B	Long	active energy [tip]	10Wh	R
011C-011D	Long	active energy [peak]	10Wh	R
011E-011F	Long	active energy [level]	10Wh	R
0120-0121	Long	active energy [valley]	10Wh	R
0122-012B	Long	active energy of this month [total/tip/peak/level/valley]	10Wh	R
012C-0135	Long	active energy of last month [total/tip/peak/level/valley]	10Wh	R
0136-013F	Long	active energy of the month before	10Wh	R

		last [total/tip/peak/level/valley]		
0140-01FF	---			
Electric quantity data				
0200	Int	voltage	0.1V	R
0201	Int	current	0.01A	R
0202	Int	active power	10W	R
0203	Int	reactive power	10var	R
0204	Int	apparent power	10VA	R
0205	Int	power factor	0.001	R
0206	Int	frequency	0.01Hz	R
0207-00FF	---			
Demand				
0600	Int	Max. voltage value	0.1V	R
0601	Int	Max. current value	0.01A	R
0602	Int	Max. active power value	10W	R
0603	Int	Max. reactive power value	10var	R
0604	Int	Max. apparent power value	10VA	R
0605	Int	Max. active power demand value	10W	R
0606	Int	Max. reactive power demand value	10var	R
0607	Int	Max. apparent power demand value	10VA	R
0608	Int	Max. voltage value of this month	0.1V	R
0609	Int	Max. current value of this month	0.01A	R
060A	Int	Max. active power value of this month	10W	R
060B	Int	Max. reactive power value of this month	10var	R
060C	Int	Max. apparent power value of this month	10VA	R
060D	Int	Max. active power demand value	10W	R

		of this month		
060E	Int	Max. reactive power demand value of this month	10var	R
060F	Int	Max. apparent power demand value of this month	10VA	R
0610	Int	active power demand value at present	10W	R
0611	Int	reactive power demand value at present	10var	R
0612	Int	apparent power demand value at present	10VA	R
0613				
Events recording				
0614	char	power on record times and year	times-year	R
0615	char	power on record month and data	month-day	R
0616	char	power on record hour and minute	hour-minute	R
0617	char	programming record times and year	times-year	R
0618	char	programming record month and day	month-day	R
0619	char	programming record hour and minute	hour-minute	R
061A	char	energy clearing times and year	times-year	R
061B	char	energy clearing month and day	month-day	R
061C	char	energy clearing hour and minute	hour-minute	R
061D-07FF				

System setting parameters

Address	Format	Data instruction	Unit	R/W
System setting				
0800-0801	---			

0802	Int	High byte: cyclic display	0x01:cyclic display !(0x01):no cyclic display	R/W
		Lower byte: first display interface after power on	0x00:U, 0x01:I 0x02:F, 0x03:P 0x04:Q, 0x05:S 0x06:PF, 0x07:EN	R/W
0803	---			
0804	Int	high byte：#1 communication meter address	1-247	R/W
		lower byte：#1 communication baud rate	0: 300 1: 600 2：1200bps 3：2400bps 4：4800bps 5：9600bps	
0805	Int	high byte:#1 communication check mode	0：N,8,1 1：E,8,1 2：O,8,1 3：N,8,2 4：E,8,2 5: O,8,2	R/W
0806-0811	---			
0812	Int	#1 time zone starting time	high byte：hour lower byte：minute	
0813	Int	#2 time zone starting time	same to #1 time zone starting time	
0814	Int	#3 time zone starting time	same to #1 time zone starting time	
0815	Int	#4 time zone starting time	same to #1 time zone starting time	
0816	Int	#5 time zone starting time	same to #1 time zone starting time	
0817	Int	#6 time zone starting time	same to #1 time zone starting time	
0818	Int	#7 time zone starting time	same to #1 time zone starting time	
0819	Int	#8 time zone starting time	same to #1 time zone starting time	
081A	Int	#9 time zone starting time	same to #1 time zone starting time	
081B	Int	#10 time zone starting time	same to #1 time zone starting time	
081C	Int	#11 time zone starting time	same to #1 time zone starting time	
081D	Int	#12 time zone starting time	same to #1 time zone starting time	
081E	Int	Rates of time zone 1 and time zone 2	high byte：time zone 1 lower byte：time zone 2 Rates： 0：tip, 1：peak 2：level 3：valley	
081F	Int	Rates of time zone 3 and time zone 4	Same to time zone 1 and time zone 2	
0820	Int	Rates of time zone 5 and time zone 6	Same to time zone 1 and time zone 2	
0821	Int	Rates of time zone 7 and time zone 8	Same to time zone 1 and time zone 2	
0822	Int	Rates of time zone 9 and time zone 10	Same to time zone 1 and time zone 2	

0823	Int	Rates of time zone 11 and time zone 12	Same to time zone 1 and time zone 2	
0824	Int	meter reading time	high byte：day lower byte：hour	

Appendix 2 MODBUS-RTU communication address information list (three phase meter)

0x03/0x04 command data register address:

Address	Format	Data description	Unit	R/W
float type data				
0000-0001	float	Phase A voltage	V	R
0002-0003	float	Phase B voltage	V	R
0004-0005	float	Phase C voltage	V	R
0006-0007	float	AB line voltage	V	R
0008-0009	float	BC line voltage	V	R
000A-000B	float	CA line voltage	V	R
000C-000D	float	Phase A current	A	R
000E-000F	float	Phase B current	A	R
0010-0011	float	Phase C current	A	R
0012-0013	float	Phase A active power	kW	R
0014-0015	float	Phase B active power	kW	R
0016-0017	float	Phase C active power	kW	R
0018-0019	float	total active power	kW	R
001A-001B	float	Phase A reactive power	kvar	R
001C-001D	float	Phase B reactive power	kvar	R
001E-001F	float	Phase C reactive power	kvar	R
0020-0021	float	total reactive power	kvar	R
0022-0023	float	Phase A apparent power	kVA	R
0024-0025	float	Phase B apparent power	kVA	R
0026-0027	float	Phase C apparent power	kVA	R
0028-0029	float	total apparent power	kVA	R
002A-002B	float	Phase A power factor	1	R

002C-002D	float	Phase B power factor	1	R
002E-002F	float	Phase C power factor	1	R
0030-0031	float	total power factor	1	R
0032-0033	float	frequency	Hz	R
0034-0035	float	import active energy	kWh	R
0036-0037	float	export active energy	kWh	R
0038-0039	float	import reactive energy	kvarh	R
003A-003B	float	export reactive energy	kvarh	R
003C-00FF	---			
time data				
0100	Char	time	year-month	R
0101	Char	time	day-hour	R
0102	Char	time	minute-second	R
0103-0105	---			
Energy data				
0106-0107	Long	import active energy	10Wh	R
0108-0109	Long	export active enregy	10Wh	R
010A-010B	Long	import reactive energy	10varh	R
010C-010D	Long	export reactive energy	10varh	R
010E-010F	Long	apparent energy	10VAh	R
0110-0111	Long	first quadrant reactive energy	10varh	R
0112-0113	Long	second quadrant reactive energy	10varh	R
0114-0115	Long	third quadrant reactive energy	10varh	R
0116-0117	Long	fourth quadrant reactive energy	10varh	R
0118-0119	Long	active energy [total]	10Wh	R
011A-011B	Long	active energy [tip]	10Wh	R
011C-011D	Long	active energy [peak]	10Wh	R
011E-011F	Long	active energy [level]	10Wh	R
0120-0121	Long	active energy [valley]	10Wh	R

0122-012B	Long	active energy of this month [total/tip/peak/level/valley]	10Wh	R
012C-0135	Long	active energy of last month [total/tip/peak/level/valley]	10Wh	R
0136-013F	Long	active energy of the month before last [total/tip/peak/level/valley]	10Wh	R
0140-01FF	---			
Electric quantity data				
0200	Int	Phase A voltage	0.1V	R
0201	Int	Phase B voltage	0.1V	R
0202	Int	Phase C voltage	0.1V	R
0203	Int	AB line voltage	0.1V	R
0204	Int	BC line voltage	0.1V	R
0205	Int	CA line voltage	0.1V	R
0206	Int	Phase A current	0.01A	R
0207	Int	Phase B current	0.01A	R
0208	Int	Phase C current	0.01A	R
0209	Int	Phase A active power	10W	R
020A	Int	Phase B active power	10W	R
020B	Int	Phase C active power	10W	R
020C	Int	total active power	10W	R
020D	Int	Phase A reactive power	10var	R
020E	Int	Phase B reactive power	10var	R
020F	Int	Phase C reactive power	10var	R
0210	Int	total reactive power	10var	R
0211	Int	Phase A apparent power	10VA	R
0212	Int	Phase B apparent power	10VA	R
0213	Int	Phase C apparent power	10VA	R
0214	Int	total apparent power	10VA	R
0215	Int	Phase A power factor		R
0216	Int	Phase B power factor		R

0217	Int	Phase C power factor		R
0218	Int	total power factor		R
0219	Int	frequency	0.01Hz	R
021A	Int	Phase A (AB line) voltage THD	0.01	R
021B	Int	Phase B voltage THD	0.01	R
021C	Int	Phase C (CB line) voltage THD	0.01	R
021D	Int	Phase A current THD	0.01	R
021E	Int	Phase B current THD	0.01	R
021F	Int	Phase C current THD	0.01	R
0220	Int	Phase A (AB line) voltage harmonic content	0.1V	R
0221	Int	Phase B voltage harmonic content	0.1V	R
0222	Int	Phase C (CB line) voltage harmonic content	0.1V	R
0223	Int	Phase A current harmonic content	0.01A	R
0224	Int	Phase B current harmonic content	0.01A	R
0225	Int	Phase C current harmonic content	0.01A	R
0226-05FF	---			
Demand				
0600	Int	Max. phase voltage value	0.1V	R
0601	Int	Max. line voltage value	0.1V	R
0602	Int	Max. current value	0.01A	R
0603	Int	Max. active power value	10W	R
0604	Int	Max. reactive power value	10var	R
0605	Int	Max. apparent power value	10VA	R
0606	Int	Max. active power demand value	10W	R
0607	Int	Max. reactive power demand value	10var	R
0608	Int	Max. apparent power demand value	10VA	R
0609	Int	Max. phase voltage value of this	0.1V	R

		month		
060A	Int	Max. line voltage value of this month	0.1V	R
060B	Int	Max. current value of this month	0.01A	R
060C	Int	Max. active power value of this month	10W	R
060D	Int	Max. reactive power value of this month	10var	R
060E	Int	Max. apparent power value of this month	10VA	R
060F	Int	Max. active power demand value of this month	10W	R
0610	Int	Max. reactive power demand value of this month	10var	R
0611	Int	Max. apparent power demand value of this month	10VA	R
0612	Int	active power demand value at present	10W	R
0613	Int	reactive power demand value at present	10var	R
0614	Int	apparent power demand value at present	10VA	R
0615	Int	phase voltage average value	0.1V	R
0616	Int	line voltage average value	0.1V	R
0617	Int	current average value	0.01A	R
0618	Int	active power average value	10W	R
0619	Int	reactive power average value	10var	R
061A	Int	apparent power average value	10VA	R
0061B	--			
Events record				
061C	char	power on record times and year	times-year	R
061D	char	power on record month and day	month-day	R
061E	char	power on record hour and minute	hour-minute	R
061F	char	programming record times and year	times-year	R
0620	char	programming record month and day	month-day	R
0621	char	programming record hour and minute	hour-minute	R
0622	char	energy clearing times and year	times-year	R
0623	char	energy clearing month and day	month-day	R
0624	char	energy clearing hour and minute	hour-minute	R
0625-07FF				

System setting parameters

Address	Format	Data instruction	Unit	R/W
System setting				
0800	---			
0801	Int	High byte: energy pulse constant	0x00: 400imp/kWh 0x01: 800imp/kWh 0x02:1600imp/kWh	R/W
		Lower byte: reserved		
0802	Int	High byte: cyclic display	0x01:cyclic display !(0x01):no cyclic display	R/W
		Lower byte: first display interface after power on	0x00:U, 0x01:I 0x02:F, 0x03:P 0x04:Q, 0x05:S 0x06:PF, 0x07:EN	R/W
0803	---			
0804	Int	high byte：#1 communication meter	1-247	R/W

		address		
		lower byte ： #1 communication baud rate	0: 300 1: 600 2：1200bps 3：2400bps 4：4800bps 5：9600bps	
0805	Int	high byte:#1 communication check mode	0：N,8,1 1：E,8,1 2：O,8,1 3：N,8,2	R/W
0806-0811	---			
0812	Int	#1 time zone starting time	high byte：hour lower byte：minute	
0813	Int	#2 time zone starting time	same to #1 time zone starting time	
0814	Int	#3 time zone starting time	same to #1 time zone starting time	
0815	Int	#4 time zone starting time	same to #1 time zone starting time	
0816	Int	#5 time zone starting time	same to #1 time zone starting time	
0817	Int	#6 time zone starting time	same to #1 time zone starting time	
0818	Int	#7 time zone starting time	same to #1 time zone starting time	
0819	Int	#8 time zone starting time	same to #1 time zone starting time	
081A	Int	#9 time zone starting time	same to #1 time zone starting time	
081B	Int	#10 time zone starting time	same to #1 time zone starting time	

081C	Int	#11 time zone starting time	same to #1 time zone starting time	
081D	Int	#12 time zone starting time	same to #1 time zone starting time	
081E	Int	Rates of time zone 1 and time zone 2	high byte： time zone 1 lower byte ： time zone 2 Rates： 0：tip, 1：peak 2：level 3：valley	
081F	Int	Rates of time zone 3 and time zone 4	Same to time zone 1 and time zone 2	
0820	Int	Rates of time zone 5 and time zone 6	Same to time zone 1 and time zone 2	
0821	Int	Rates of time zone 7 and time zone 8	Same to time zone 1 and time zone 2	
0822	Int	Rates of time zone 9 and time zone 10	Same to time zone 1 and time zone 2	
0823	Int	Rates of time zone 11 and time zone 12	Same to time zone 1 and time zone 2	
0824	Int	meter reading time	high byte：day lower byte：hour	

The information in this document is subject to changes without any further notice.

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