

SFERE

User's Manual

DIN-rail Mounted Energy Meter

This manual is applied to the following models:

DDS1946/DDS1946-T

DSS1946/ DSS1946-T

DTS1946/DTS1946-T(CT)

DDSF1946/DSSF1946/DTSF1946

JIANGSU SFERE ELECTRIC CO., LTD.

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1. Introduction

1.1 Compliance with standards

IEC62053-21:2003 Electricity metering equipment (a.c.)-Particular requirements-Part 21: Static meters for active energy (classes 1 and 2)

IEC62053-23:2003 Electricity 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

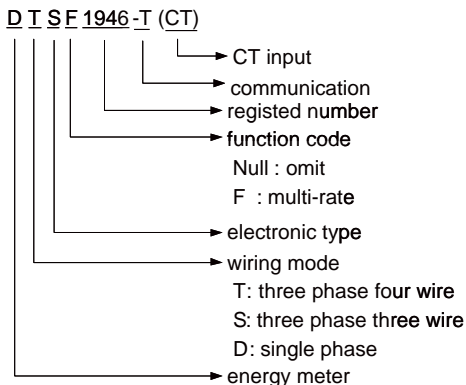
DIN-rail mounted energy meters are designed and produced according to user's real electricity consumption situation by adopting advanced energy measurement IC and using digital sampling processing and SMT technologies. They are used to measure the real-time parameters of voltage, current, power,

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DIN-rail Mounted Energy Meter

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

Model Function		Single phase power meter		Three phase power meter			
		Single phase energy meter	Single phase multi-rate energy meter	Three phase power meter		Three phase multi-rate power meter	
				DDS 1946/ DDS 1946-T	DDSF 1946	DSS 1946/ DSS1946-T	DTS 1946/ DTS 1946-T(CT)
Wiring mode	Single phase	√	√	-	-	-	-
	Three phase three wire	-	-	√	-	√	-
	Three phase four wire	-	-	-	√	-	√
Rated voltage	230V	√	√	-	-	-	-

	3x400V	-	-	√	-	√	-
	3x230/400V	-	-	-	√	-	√
Current specification	Direct input	5(30)A, 10(60)A, 20(100)A		20(100)A			
	Input via CT	1.5(6)A, CT ratio range: 1~1999					
Real-time measurement	Voltage & current	√	√	√	√	√	√
	Power	√	√	√	√	√	√
	Power factor	√	√	√	√	√	√
	Frequency	√	√	√	√	√	√
	THD ^{Note 2}	-	-	√	√	√	√
Energy metering	Bi-directional energy	√	√	√	√	√	√
	Multi-rate energy	-	√	-	-	√	√
Communication interface RS485		○	√	○	○	√	√
Energy pulse		√	√	√	√	√	√
Display mode		LCD	LCD	LCD	LCD	LCD	LCD

Note: 1. In the upper format, √ means the function is available; - means the function is not available; ○ means the function is only available for the model with -T such as DDS1946-T, DSS1946-T and DTS1946-T(CT) ;

2. THD value can be accessed via Modbus data reading only.

4. Technical parameters

Electrical feature				
Model / Function		DDS1946	DSS1946	DTS1946
				DDS1946-T
		DDSF1946	DSSF1946	DTSF1946
Accuracy		Class 0.5S or Class 1		
Rated voltage		230V	3x400V	3x230/400V
Input current	Direct input	5(30)A,	20(100)A	

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		10(60)A 20(100)A		
	Input via CT	1.5(6)A, CT ratio range: 1~1999		
Frequency		50/60 Hz		
Wiring mode		Single phase	three phase three wire	three phase four wire
Voltage range		Un±15%		
Consumption	voltage circuit consumption	< 5VA		
	current circuit consumption	< 2VA		
Start current	direct input	Class 0.5S: --, Class 1: 0.004Ib		
	input via CT	Class 0.5S: 0.001In, Class 1: 0.002In		
Energy pulse		Optoelectronic isolation output, pulse width (80±20%) ms		
Time error		≤0.5s/day		
Communication feature				
RS485 communication interface		Modbus-RTU protocol(optional) , baud rate up to 9600bps Note: there is no communication interface for DDS1946, DSS1946 and DTS1946.		
Mechanical feature				
Dimension		72×90×63.5	126×90×63.5	
IP protection		IP51 (panel) /IP20 (case)		
Environment feature				
Work temperature		(-10~55)°C		
Storage temperature		(-25~70)°C		
Relative humidity		(5~95)% (no condensation)		
EMC				

Electrostatic discharge immunity	IEC 61000-4-2-III
Radiated, radio-frequency, electromagnetic field immunity	IEC 61000-4-3-III
Electrical fast transient/burst immunity test	IEC 61000-4-4-IV
Surge immunity	IEC 61000-4-5-IV
Immunity to conducted disturbances, induced by radio-frequency fields	IEC 61000-4-6-III
Power frequency magnetic field immunity	IEC 61000-4-8-III
Voltage dips, short interruptions and voltage variations immunity	IEC 61000-4-11-III

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.

5.3 Events recording

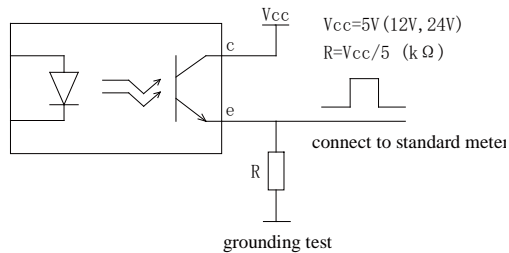
The meter has events recording function. It can record its power on times, the latest power on time, programming times, the latest programming time, energy clearing times and the latest energy clearing time.

5.4 Communication function

- RS485 interface is isolated from the inside of the meter, and there is lightning protection circuit in the meter.
- Realize RS485 communication through PC to do programming, setting and meter reading.

5.5 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.

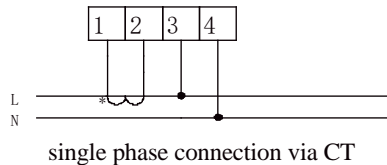
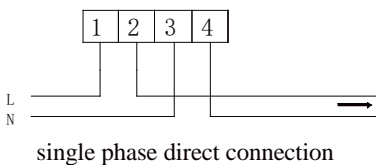


Energy pulse testing diagram

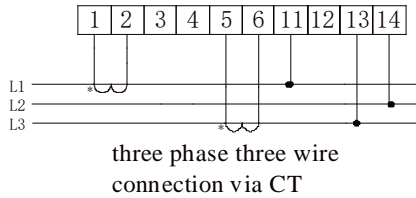
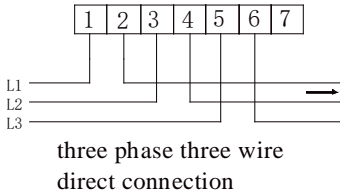
6. Installation and wiring

6.1 Wiring mode

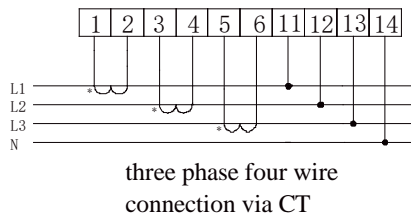
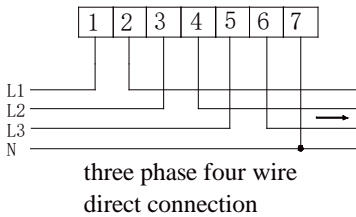
Single phase meter



Three phase three wire

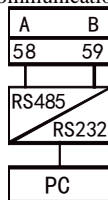


Three phase four wire

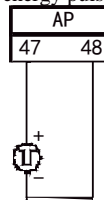


Signal terminal wiring diagram

communication



energy pulse

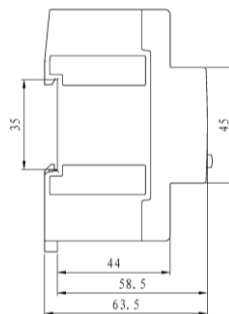
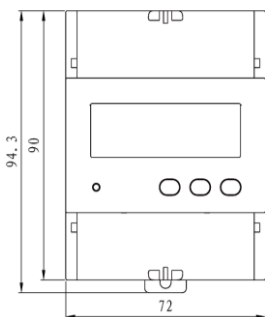


6.2 Outline dimension

Single phase meter outline dimension (mm)

front view

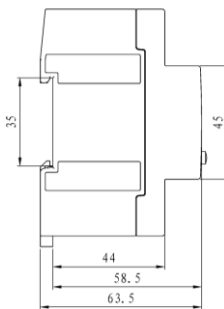
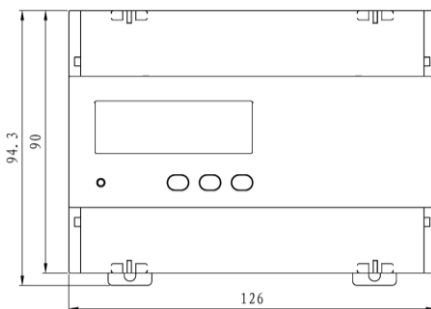
side view



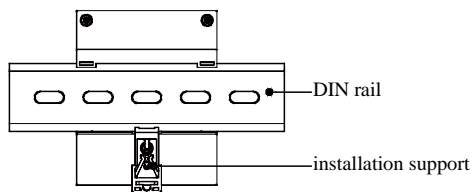
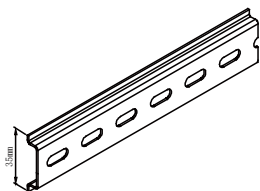
Three phase meter outline dimension (mm)

front view

side view



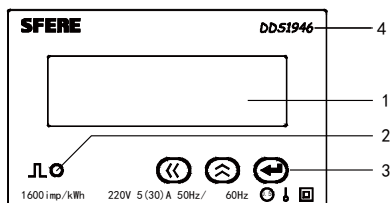
6.3 Installation method



7. Operation

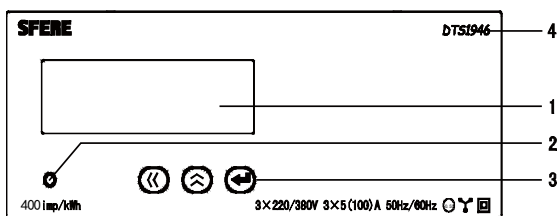
7.1 Panel description

7.1.1 Single phase energy meter



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

7.1.2 Three phase energy meter



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

7.2 Display





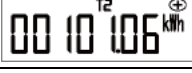
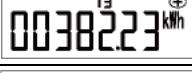
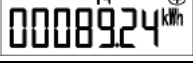
DIN-rail mounted energy meter shows the measured data of voltage, current, power, power factor, frequency and electric energy. Press << and >> buttons at the same time to switch between electric energy interface and electric quantity interface.

Energy display interfaces







Display interface	Description
	Import active electric energy: EP =780.62 kWh

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	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

Energy display interfaces for the meter with CT (CT ratio range :1 ~1999).





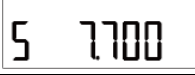


Display interface	Description
	Import active energy: EP = 7200780.62 kWh
	Export active energy: EP- = 0.00 kWh
	Import reactive energy: EQ = 18.80 kvarh
	Export reactive energy: EQ- = 7.10 kvarh
	Total tariff energy (T1): 36000208.09 kWh
	Total tariff energy (T2): 18000101.06 kWh

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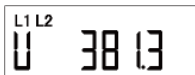

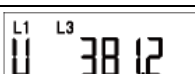


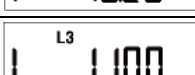
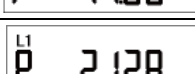
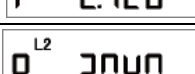
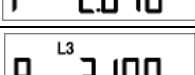
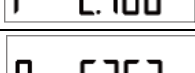
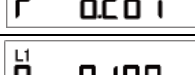
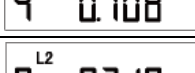
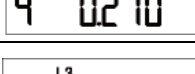
	Total tariff energy (T3): 1000382.23 kWh
	Total tariff energy (T4): 1000089.24 kWh

Electric parameters display interface of single phase meter:

Display interface	Description
	Voltage: $U = 220.0 \text{ V}$
	Current: $I = 35.00 \text{ A}$
	Active power: $P = 7.700 \text{ kW}$
	Reactive power: $Q = -0.006 \text{ kW}$
	Apparent power $S = 7.700 \text{ kVA}$
	Power factor $PF = 1.000$
	Frequency $F = 50.00\text{Hz}$


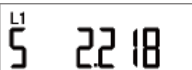

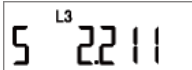



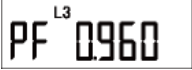
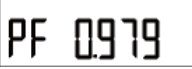


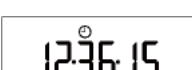
Electric quantity interface of three phase meter (e.g. three phase four wire mode)

Display interface	Description
	Phase voltage U_a $U_a = 220.1 \text{ V}$
	Phase voltage U_b $U_b = 220.2 \text{ V}$

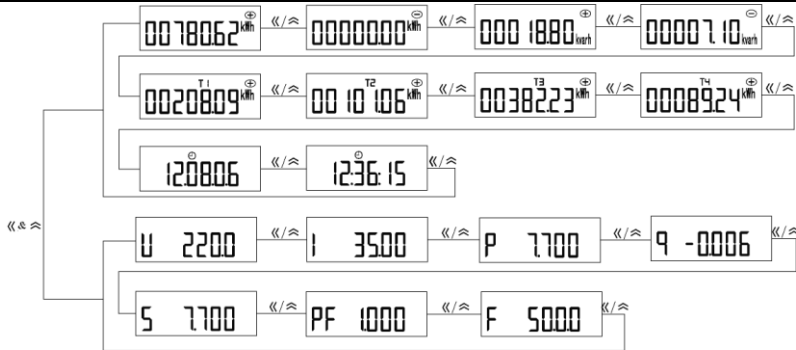
	<p>Phase voltage U_c $U_c = 220.0 \text{ V}$</p>
	<p>Line voltage U_{ab} $U_{ab} = 381.3 \text{ V}$</p>
	<p>Line voltage U_{bc} $U_{bc} = 381.2 \text{ V}$</p>
	<p>Line voltage U_{ca} $U_{ca} = 381.2 \text{ V}$</p>
	<p>Phase A current $I_a = 10.10 \text{ A}$</p>
	<p>Phase B current $I_b = 10.20 \text{ A}$</p>
	<p>Phase C current $I_c = 11.00 \text{ A}$</p>
	<p>Phase A active power $P_a = 2.128 \text{ kW}$</p>
	<p>Phase B active power $P_b = 2.040 \text{ kW}$</p>
	<p>Phase C active power $P_c = 2.100 \text{ kW}$</p>
	<p>Total active power $P = 6.267 \text{ kW}$</p>
	<p>Phase A reactive power $Q_a = 0.108 \text{ kvar}$</p>
	<p>Phase B reactive power $Q_b = 0.210 \text{ kvar}$</p>
	<p>Phase C reactive power $Q_c = 0.098 \text{ kvar}$</p>

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	Total reactive power $Q = 0.416 \text{ kvar}$	
	Phase A apparent power $S_a = 2.218 \text{ kVA}$	
	Phase B apparent power $S_b = 2.207 \text{ kVA}$	
	Phase C apparent power $S_c = 2.211 \text{ kVA}$	
	Total apparent power $S = 6.636 \text{ kVA}$	
	Phase A power factor $PF_a = 0.998$	
	Phase B power factor $PF_b = 0.980$	
	Phase C power factor $PF_c = 0.960$	
	Total power factor $PF = .979$	
	Grid frequency $F = 50.00 \text{ Hz}$	
	Time: year-month-day 2012, August 6th	Note: Time Date function is only available in Multi-tariff meters with models
	Time: hour-minute-second 12: 36: 15	

Display interfaces



8. Setup

Enter programming mode

Keep pressing ◀ and ▶ buttons for more than 3 seconds in electric energy display interface until E_{odE} appears. Then press ◀ or ▶ button to input password (defaulted as 0000). After inputting correct password, press ⏪ button to enter setting interface.

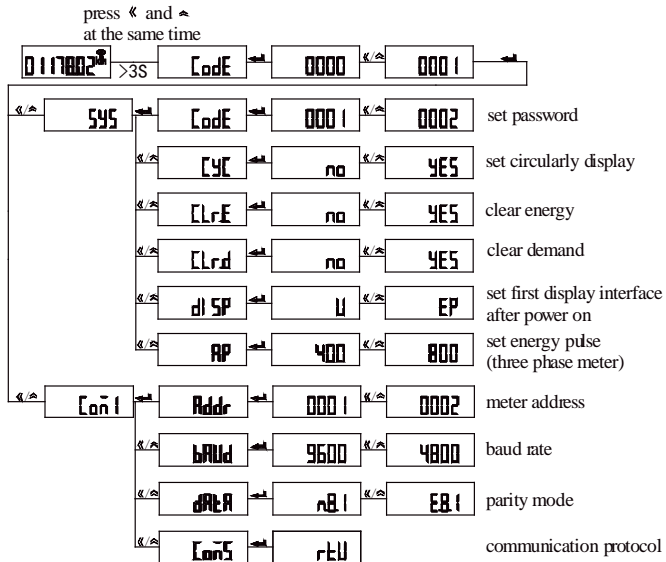
Exit programming mode

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, $n\#$ appears. There are two choices at this situation:

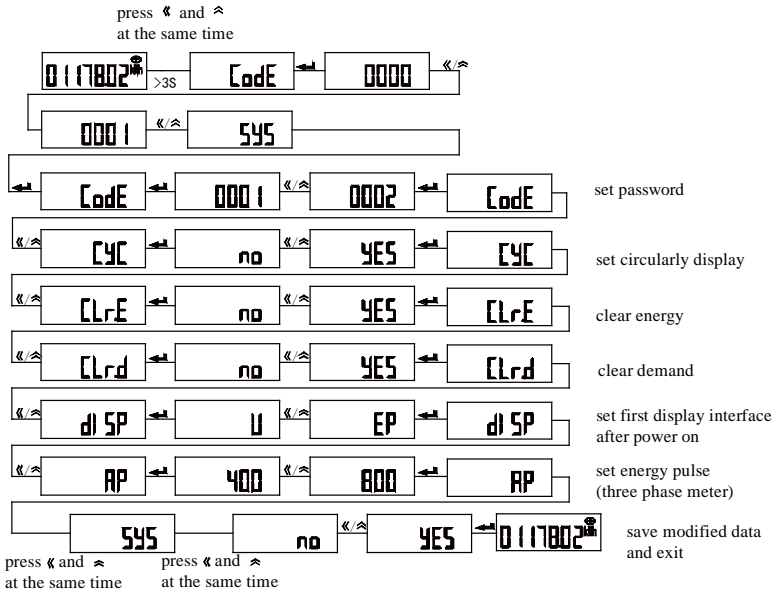
- 1) Press ⏪ button not to save setting parameters;
- 2) Press ⏪ ◀ and ▶ buttons to select YES , then press ⏪ button to save setting parameters.

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.

Setup menu

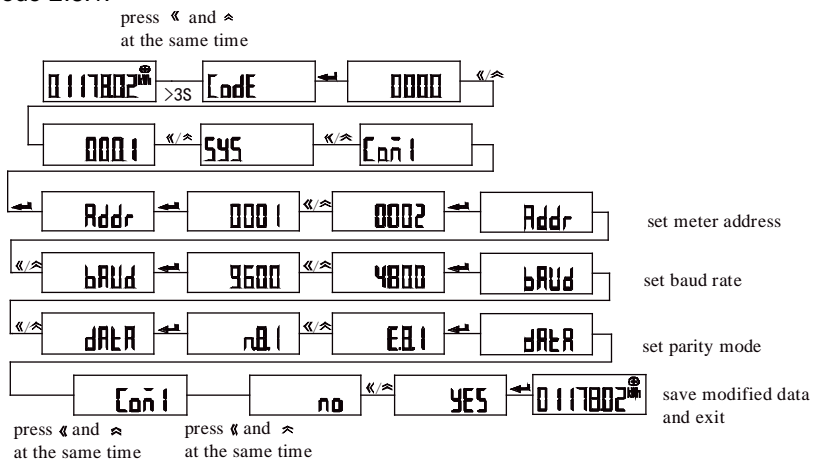


System parameter setup menu



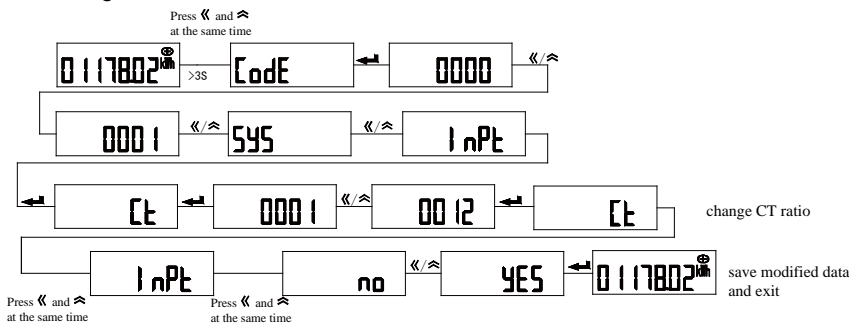
Communication setting

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



CT ratio setup

Change CT ratio from 1 to 12.



CT Ratio	Meter Setting	CT Ratio	Meter Setting
30/5A	6	800/5A	160
60/5A	12	1000/5A	200
100/5A	20	1200/5A	240
150/5A	30	1600/5A	320
200/5A	40	2000/5A	400

250/5A	50	2500/5A	500
300/5A	60	3200/5A	640
400/5A	80	4000/5A	800
500/5A	100	5000/5A	1000
600/5A	120		

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	<u>0x01</u>	<u>0x03</u>	<u>0x00 0x00</u>	<u>0x00 0x06</u>	<u>0xC5 0xC8</u>
Slave response	frame structure	address code	function code	data code		CRC check code
	byte	1 byte	1 byte	byte of register	register value	
	message example	<u>0x01</u>	<u>0x03</u>	<u>0x0C</u>	<u>12-byte data</u>	<u>CRC16</u>

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	frame structure	address code	function code	data code				CRC check code
				initial relay address	relay length	relay byte	written value	
request	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	<u>0x01</u>	<u>0x10</u>	<u>0x08</u> <u>0x02</u>	<u>0x00 0x01</u>	<u>0x02</u>	<u>0x01</u> <u>0x00</u>	<u>0x2FE2</u>
slave response	frame structure	address code	function code	data code			CRC check code	
				initial relay address	relay length			
	byte	1 byte	1 byte	2 bytes	2 bytes		2 bytes	
	message example	<u>0x01</u>	<u>0x10</u>	<u>0x08</u> <u>0x02</u>	<u>0x00 0x01</u>		<u>0xA269</u>	

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.

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 energy	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	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 of this month	10W	R
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	times-year	R

		year		
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	1-247	R/W

		communication meter 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 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	

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		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	
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**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 energy	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 month	0.1V	R
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	hour-minute	R

		minute		
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	
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	0: N,8,1	R/W

		communication check mode	1: E,8,1 2: O,8,1 3: N,8,2	
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	high byte:	

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		time zone 2	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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