Tianjin Grewin Technology Co.Ltd

Web:www.grewin-tech.com .

Add:DongLi Distr Tianjin City, China

Phone:+ 86-22-84943756

WhatsApp:+86-13072088960

Email:salesmanager@grewin-tech.com

TPM300A-96A Module

Multiple Function Power Meter

User Guide

Attention

User should read this manual carefully before preparing to install, operate, serve or maintain. Below special words will across all the manual, or will stick onto the instructions to remind the potentially dangerous or to mark the important points.

⚠ **DANGE**
'⚠DANGER' SHOWS AN DIRECT DANGER.IF CAN'T BE AVOIDED,IT WILL LEAD TO IMMEDIATE DEATH OR BAD INJURED!

⚠ **WARNIN**
'⚠ WARNING'SHOWS A POTENTIALLY DANGER.IF CAN'T BE AVOIDED,IT COULD LEAD TO DEATH OR BAD INJURED!

⚠ **NOTICE**
'⚠NOTICE' SHOWS A POTENTIALLY DANGER.IF CAN'T BE AVOID,IT COULD LEAD TO SMALL OR MODERATE INJURED!

NOTICE
'NOTICE' SHOWS A POTENTIALLY DANGER.IF CAN'T BE AVOID,IT COULD LEAD TO DIRECT PROPERTY DAMAGE

Declaration

Electrical equipment should be installed, operated, used and maintained by professional staffs. This manual is not guidance to the staffs without professional training. This company will be not liable to any adverse consequence caused by violating the rules.

This company reserve right of content amending without notify again. All the products and service warranty are in the attached guarantee list.
This company is not liable to the technical error or the textual error and textual error in this manual. Unless the copy right authorization , this manual is strictly prohibited to be copied, quoted and translated without written approval.

Safety Instruction

This part includes the safety instructions which should be complied before installing, serving and maintaining the equipment.

⚠WARNING!
Danger Of Electric Shock,Fire And Exploding. ➢ Only profession staffs could install this equipment after complete read the manual. ➢ Don't work alone. ➢ Power dump before equipment testing and maintaining. ➢ Supposing the circuit is live before making sure it's fully   discharged ➢ Pay special attention to the power source.Considering all the source, including the possibility of inversely feeding. ➢ Cut off the power when work on or in the equipment. ➢ Use the right tester to make sure the power is fully cut off. ➢ Be careful of the potential danger. Do personal protective and check whether other tools or things leave over. ➢ Don't touch the live busbar. ➢ Right and safe operation make equipment running well and to avoid the damage. ➢ Cut off all the connecting in-out lines with the equipments when insulation testing to avoid the damage to the instrument.   If don't execute above instructions could lead body injured and death.

Catalogue

1.Introduction

1.1Introduction

TPM 300A is intelligent mutilpurpose power which integrates the remote measuring and remote communication functions.

This meter could match different function includes test, display and Remote Transfer all the common power parameters, max. 4-ch digital inputs(optional),2-ch relay output (optional),1 ch 4~20mA analog output（optional）,active and reactive energy impulse output (optional.And communicate with the computer to be a intelligent monitoring system.

1.2Functions

1.2.1 Function description
  1.2.1.1 Analog measure
  - Voltage
  - Current
  - Voltage unbalance degree
  - Current unbalance degree
  - Current load degree
  - Active power, reactive power and apparent power
  - Power factor
  - Frequency
  - Total active energy absolute ,total reactive energy absolute
  - Input active energy absolute, input reactive energy absolute
  - Output active energy absolute, output reactive energy absolute
  - 4 quadrants reactive energy

  1.2.1.2 AO (optional)
    1 ch 4~20mA analog output, could connect any La, Lb, Lc, Ua, Ub, Uc, Uab, Ubc, Uca, Total& phase active/reactive/apparent power, total/phase power factor and so on
  1.2.1.3 Remote transfer (optional)
    2DI(max.4 DI) real time switch-status monitoring
  1.2.1.4   Remote control (optional)
    2 relay output to control the electrical level and impulse output type
  1.2.1.5   Communications
  - Communication interface:RS485
  - ModBUS-RTU protocol
  1.2.1.5 Display

Real time display above parameters and DI status

1.2.1.6 Factors setting and don't lose even power off

1.3. Technical Indicators

ITEMS			NOTES
Input Test Display	Web		3P3L,3P4L Configuration
	Voltage	Rated value	AC400V or AC100V Optional
		Overload	Measurement:1.2 times, Instantaneous 2 times/10s
		Consumption	<1VA per phase
		Impedance	>400kΩ
		Precision	RMS measurement Precision ±0.2%
	Current	Rated value	AC5A or AC1A
		Overload	Continued 1.2 times Instantaneous 10 times/10s
		Consumption	<0.4VA per phase
		Impedance	<20mΩ
		Precision	RMS measurement Precision ±0.2%
	Frequency		40~60Hz Precision ±0.02Hz
	Power		Active power, reactive power, apparent power Precision ±0.5%
	Energy		• Total active energy absolute .Total reactive energy absolute • Input active energy absolute.Input reactive energy absolute • Output active energy absolute • Output reactive energy absolute • 4 quadrants reactive energy • Precision active-energy ±0.5%,reactive-energy ±1%
	Display		• LED or LCD display • Modbus communication to change the display interface
Switching value input	Input		2-ch input(max 4 channels), passive node isolation
	Isolation Voltage		2500Vrms
Digital output	Output		1-ch output(optional),mechanical contact(passive)
	Output type		4~20mA accuracy +/-0.5%
	Load capacity		≤500Ω
Switching value output(optional)	Output type		2-CH,Passive mechanical contact
	Voltage		Max. AC250V DC30V
	current		Max. 5A
Electrical degree output	Type		Total active energy absolute, Total reactive energy absolute
	Positive max voltage		50V
	Pulse constant		Active: 3200imp.kwh Reactive:3200imp/kvarh
	Output max current		25mA

	Isolation voltage	2500Vrms
Comm.	Interface	RS485
	Protocol	ModBUS-RTU
	Baud rate	2400/4800/9600/19200bps
	Data format	Odd parity check 1 digit, even parity check 1 digit, none parity check:1/2 digit optionally
Working power	Working voltage	AC:220+/-10%
	Power consumption	≤2VA
Work environment	Work temperature	-20℃～55℃
	Storage temperature	-40℃～85℃
	Humidity	0～95% non-condensate
Safe	Insulating strength	Between input/output/hull/power supply: 2kV Acrms，1 min.
Dimension weight	Size	96mm×96mm×75 mm
	Weight	0.4kg

1.4.EMC Standard

TEST ITEMS	LEVEL	STANDARD
High frequency anti-jamming test	Ⅲ，Ⅳ	GB/T 15153.1/1998
Electrostatic discharge anti-jamming test	Ⅲ	GB/T 15153.1/1998
Electrical fast transient anti-jamming test	Ⅲ	GB/T 17626.4-2008
Surge anti-jamming test	Ⅲ	GB/T 15153.1/1998
Power frequency magnetic fields anti-jamming test	Ⅳ，Ⅴ）	GB/T 17626.8-2006

2.Installation

2.1 Installation

2.1.1 Dimension of PM 300A
- Meter dimension size:96*96*75mm
- Panel size:96*96mm
- Slot size:91.5 $_{-0.0}^{+0.5}$ mm × 91.5 $_{-0.0}^{+0.5}$ mm
- Min. Side size is 71mm

2.1.2 Installation steps:
- Slots on the switchgear should be 91.5 $_{-0.0}^{+0.5}$ mm × 91.5 $_{-0.0}^{+0.5}$ mm
- Take down the fixed mount of the meter
- Put the meter into the slots and insert the fixed mount
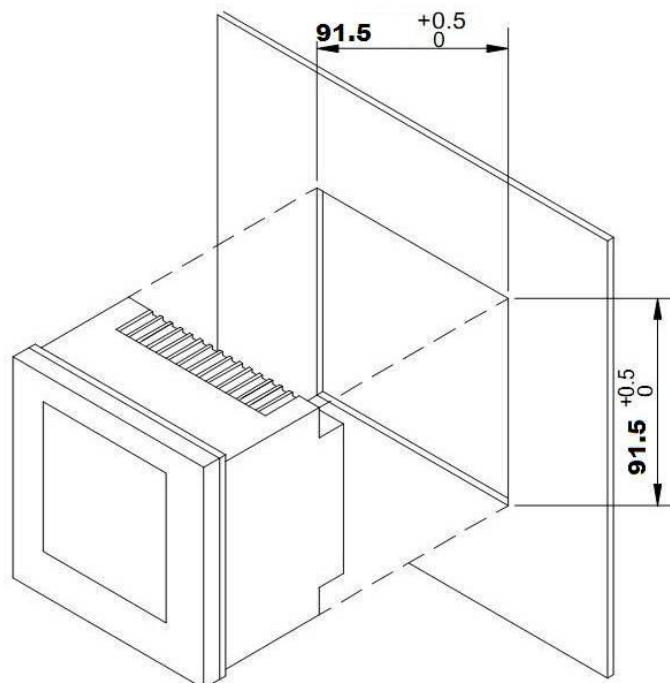
Fig.1 Installation schematic diagram

Notice
Avoid close to the system with electromagnetic interference

2.2 Terminal wiring

2.2.1 Terminal definition
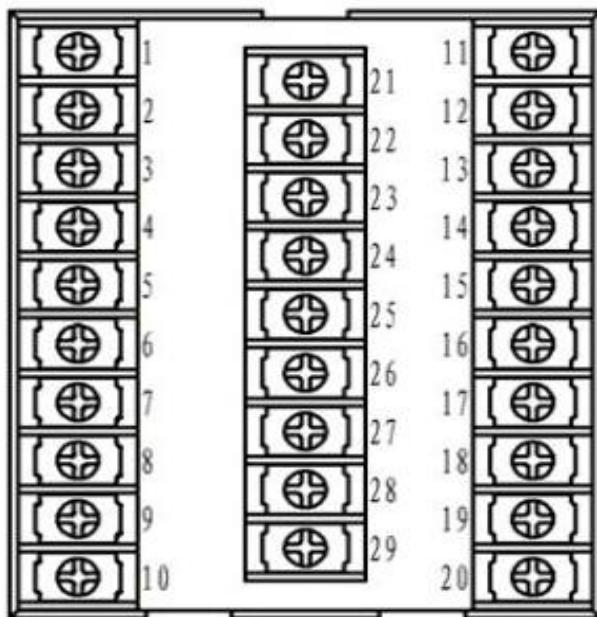
Fig.2 Terminal definition

Terminal definition LIST

POWER SUPPLY	1	L	CURRENT INPUT	11	I11
	2	N		12	I12
COMM.	3	SHLD		13	I21
	4	B-		14	I22
	5	A+		15	I31
REMOTE COMM.	6	DI4		16	I32
	7	DI3	VOLTAGE INPUT	17	U1
	8	DI2		18	U2
	9	DI1		19	U3
	10	COM		20	UN
AO	21	AO+	REMOTE CONTROL	26	DO11
	22	AO-		27	DO12
ELECTRIC PULSE OUTPUT	23	P+		28	DO21
	24	Q+		29	DO22
	25	PQ-			

2.3 Terminal wiring

2.3.1 Voltage and current input wiring

Introduction:

- UA :A phase voltage input
- UB :B phase voltage input
- UC :C phase voltage input
- UN :N phase voltage input
- L/+ :Power supply+
- N/- :Power supply -
- PE :Protective grounding
- NC :No wiring
- NC :No wiring
- DI1 :Digital input 1
- DI2 :Digital input 2
- COM :Digital input common point
- I11 :A phase current input
- I12 :A phase current output
- I21 :B phase current input
- I22 :B phase current output
- I31 :C phase current input
- I32 :C phase current output
- NC :No wiring
- NC :No wiring
- RS485+
- RS485-
- SHLD
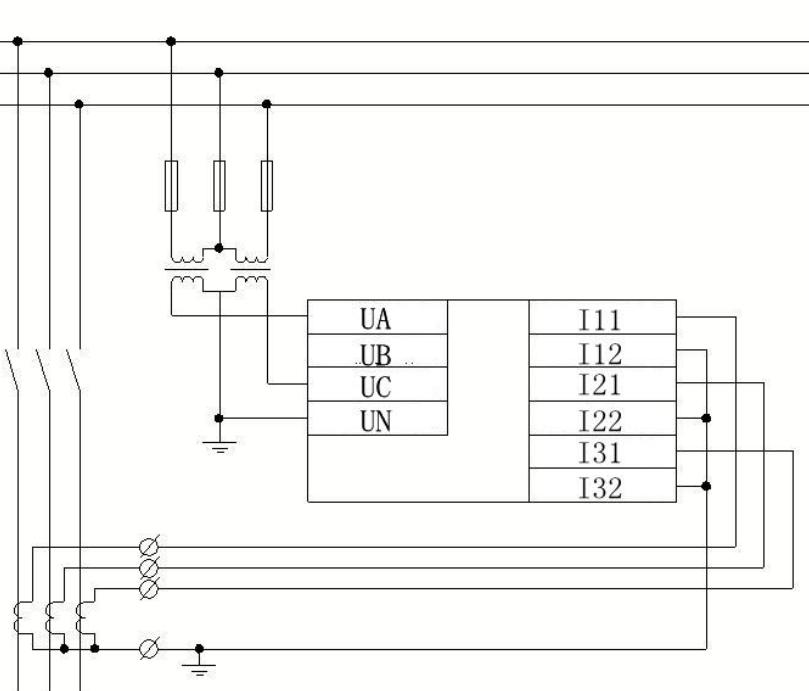
Fig.3   3 phase 4 wire 3PT-3CT wiring
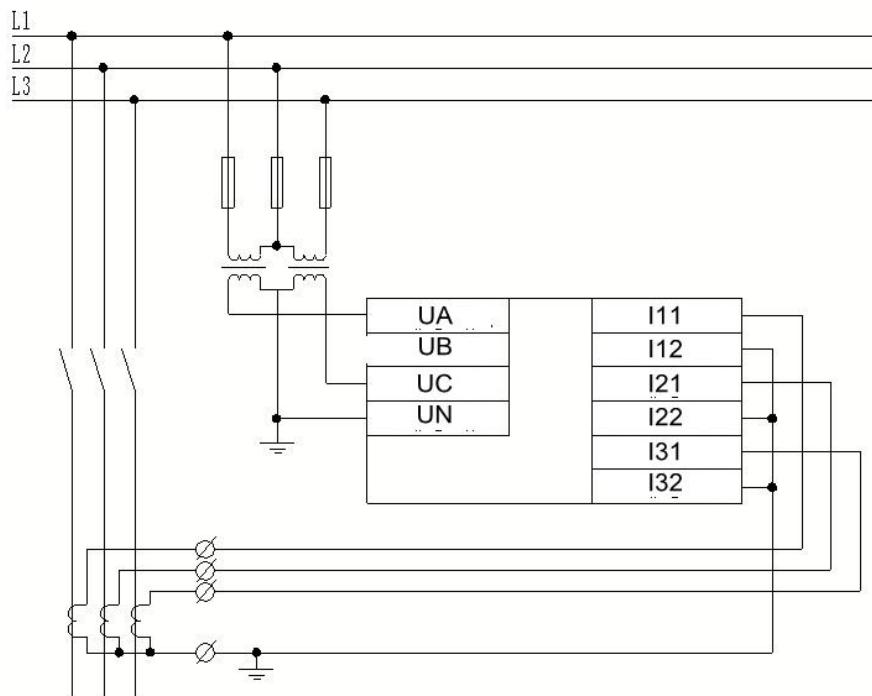
Fig.4   3 phase 3 wire 2PT-3CT wiring
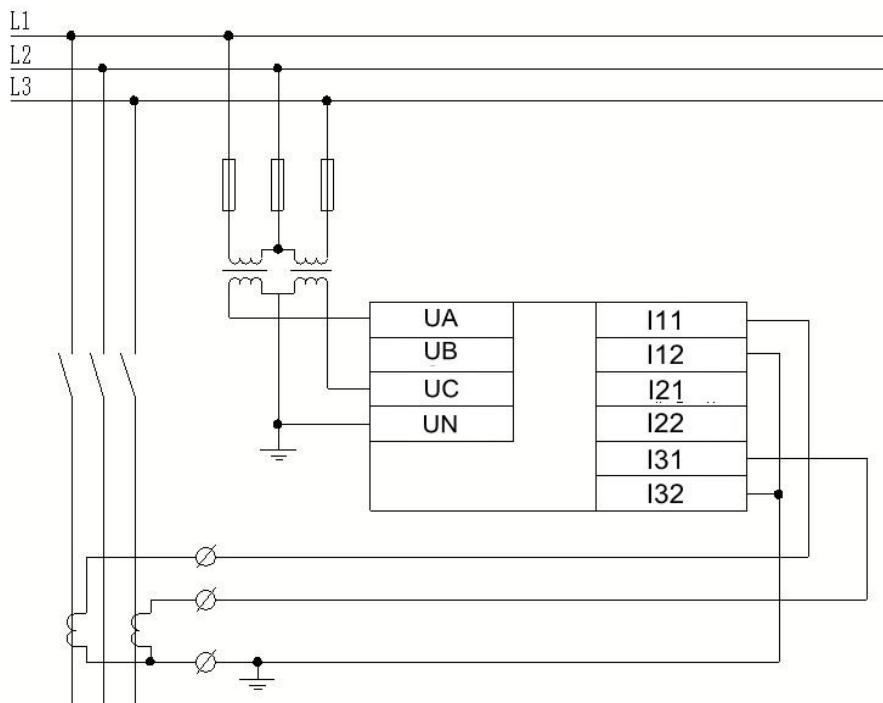
Fig.4   3 phase 3 wire 2PT-2CT   phase voltage wiring

Fig.2 wiring method, should to setting the power meter as 3P4L
Fig.3&4,should set the power meter as 3P3L

Notice

1.The input voltage should not exceed the nominal input voltage.Otherwise must use PT.Short circuit is forbidden for the PT to avoid the high current.1A fuse is must in the voltage input end

2. If there are other meters on the CT,pls use the combination method.Pls first disconnect the CT primary loop or short circuit the secondary circuit before remove the current input of meter.CT is forbidden to open circuit to avoid high voltage.

3.It's better to use the wire connect bank but not to connect the CT directly for easy dismounting

4.Make sure the voltage and current is same phase and same direction

2.3.2 Communication wiring

Communication wiring, and the impedance value that matching the resistance is 120Ω ,as fig.2.3.2.1 Communication loop wiring as fig.5
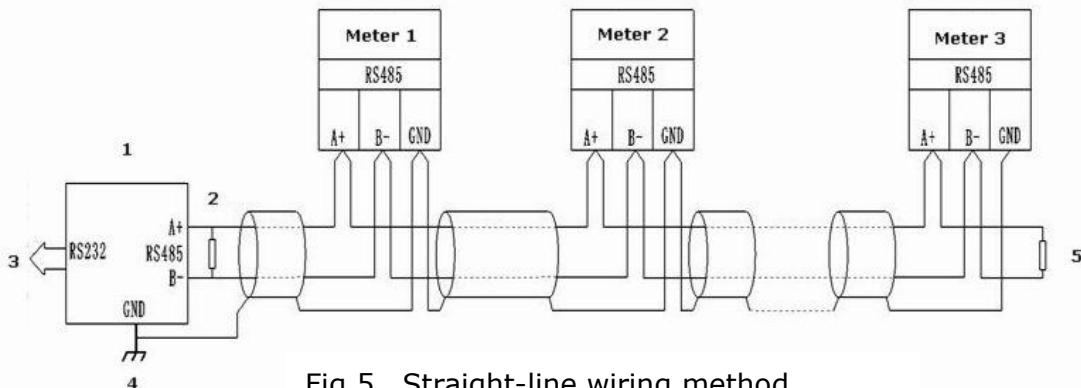

Fig.5   Straight-line wiring method

1. RS232/RS485 convertor
2. Matched resistance, also 5
3. Earth grounding
4. PC communication port
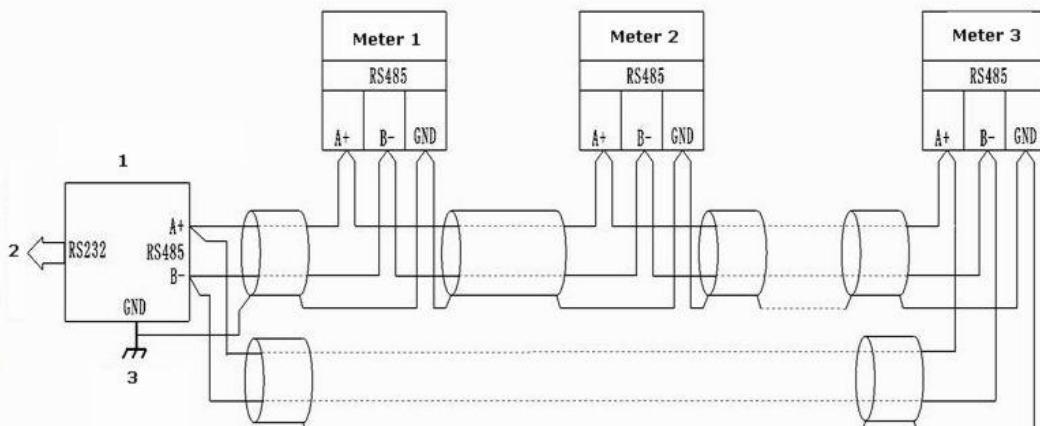
Fig.6   Loop wiring method

1. RS232/RS485 convertor   2. PC communication port   3. Earth grounding

Monitoring the switch value and digital value of two branch nodes, max. 4 .

Opto-isolated input. The isolated voltage is 2500VAC.Isolated 24VDC output from the inner supply input loop power for the branch nodes. The wiring diagram as below:
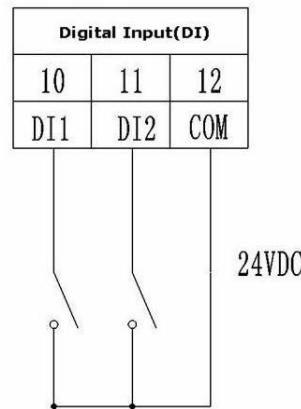

Fig.7   DI input wiring

2.3.4 DI AO transmitting output (optional)
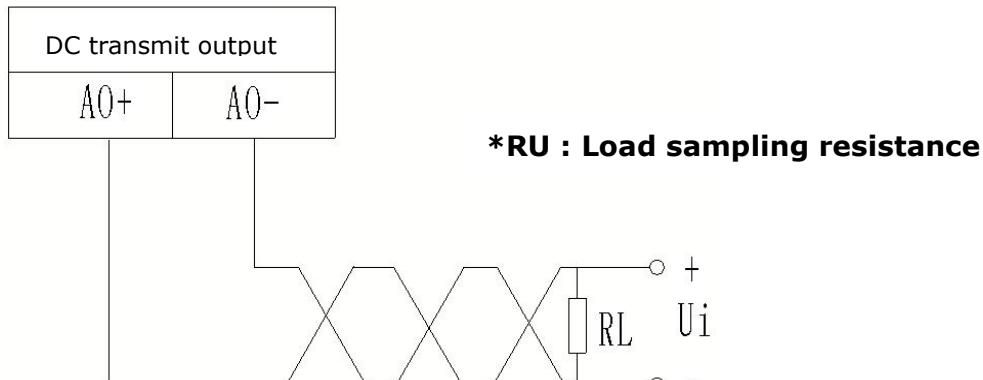
Fig.8   AO transmitting wiring

2.3.5 DO relay output (optional)

DO relay control the output node as 5A/30VAC or 5A/250VAC.

When the load current is bigger than above value, it should to adopt a intermediate relay. The wiring method as below 2.3.5.Optional electric level output and impulse output mode.
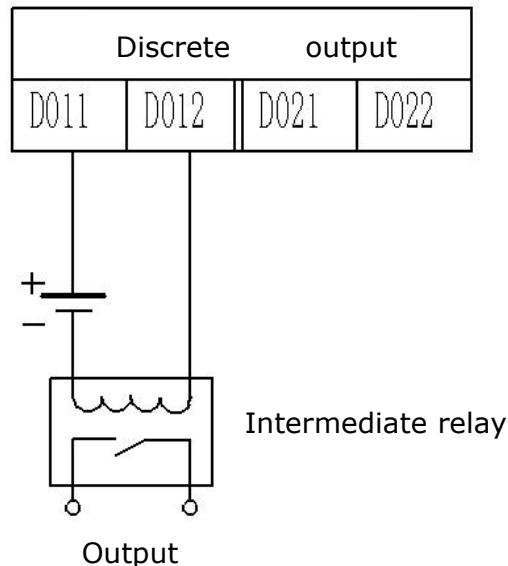
Fig.9 DO wiring method

2.3.6 Electric degree output(optional)

This function is for active electric degree and reactive electric degree output. It adopts opto-isolator method and is used to verity and remote transmit the degree data.
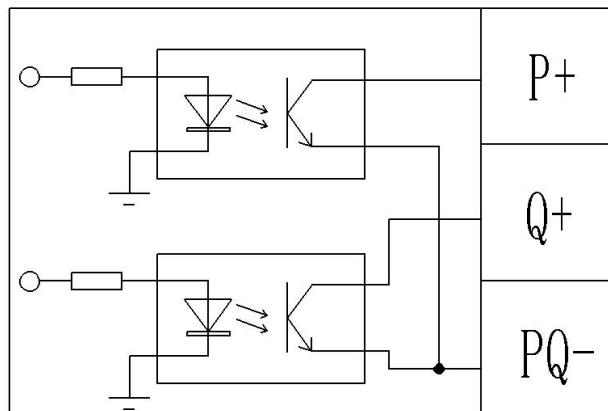

Fig.10 Impulse output

2.3.7 Auxiliary power supply

As below pic. Show, this power meter is designed to use 50Hz,220v+/-10% AC. If you have other requirement, pls contact us. Pls notice, a 2A fuse is needed in the live wire.
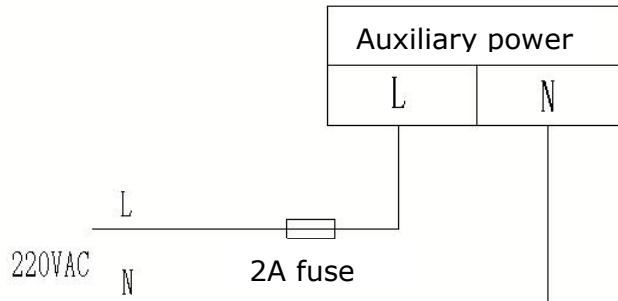
Fig.11 Auxiliary power wiring method

Notice

1.The conductor cross section of the connection wire to the device should meet the following requirements: the cross section of current wires is less than 2.5mm^2,the cross section of voltage wires is less than 1.0mm^2

2.In order to reduce the impact of current at startup,it is recommended for each power wire connects not more than 40 devices.

3.The communication wire must adopt the shielded twisted pair line.The PS485+,RS485-of the communication wire should be connected correctly.

4.When straight-line wiring method is used,100~120Ω matching resistance should be connected between RS485+and RS485-terminals.

5.When the baud rate is 9600bps,the length of the communication wires should be less than 1200m.

3.LED screen

3.1 Illustration of the LED screen

Introduction:

Voltage: V, kV
Current: A
Frequency: Hz

Power factor: PF
Active power: kW
Reactive power: kVar
Apparent power: Kva

Comm. status indication
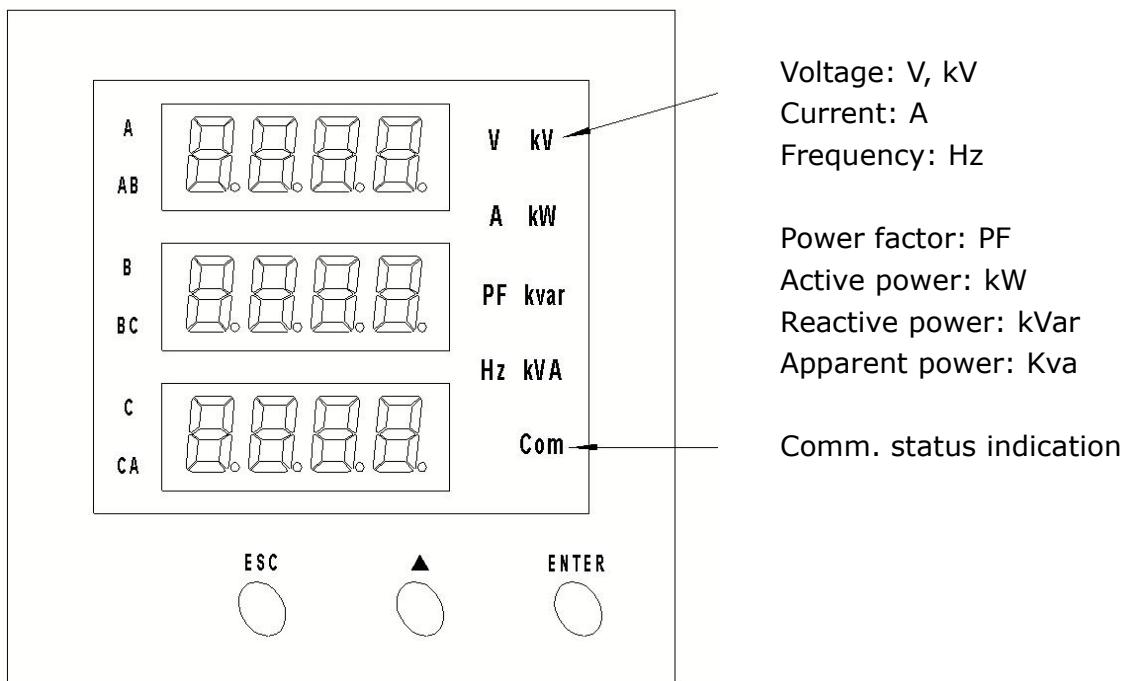
Fig.3.1   Power panel and indication

3.2 Buttons:

Introduction: There are total THREE buttons
It's different functions under the different work mode. Short press and long press is also different.
Short press: press and loosen in 1s   Long press: press last more than 1s
3.2.1 Button function list

Work mode	-	ESC	▲	ENTER
Measure mode	Short press	Zone 1 switch	Zone 2 switch	Zone 3 switch
	Long press			Enter setting
Setup mode	Short press	Plus-minus switch	+	-shifting
	Long press	Esc		Storage and enter the next manual

3.3 LED measure mode

After power on, the meter enter the measure mode. Under this mode, we could check kinds of the measurement parameters.

3.3.1 Zone 1 display:

Total 5 pages and display:

Current, phase voltage, line voltage, DI, DO.

Short press ESC button to choose different pages.*Pls notice,when 3 Phase 3 Wire,it can't display the voltage page, the line voltage can't display the Uca.

Separate phase current	Separate phase voltage	Separate line
A 5.000 B 5.000 C 5.000 A	A 220.0 B 220.0 C 220.0 V	AB 380.0 BC 380.0 CA 380.0 V

DI	DO
dI 1.2.3.4. 1.0.0.0.	do 1.2. 1.0.
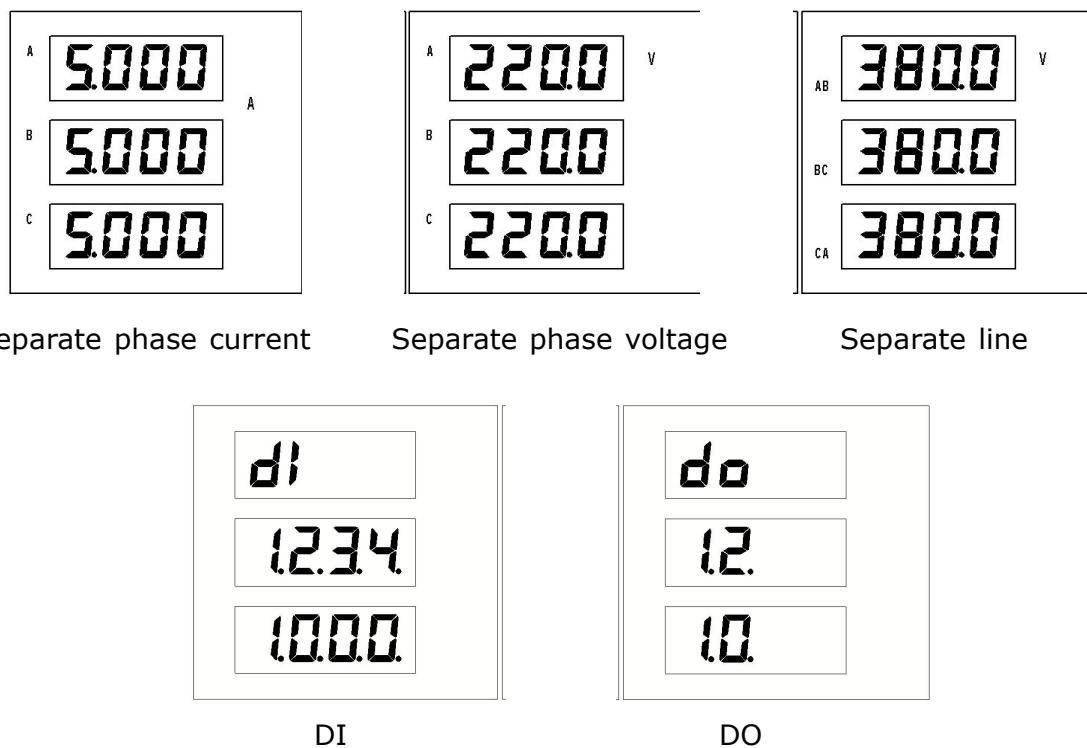
Fig.3.2   Zone 1 display

DI indicate:

the second line display the 1, 2,3,4, it means the DI1,DI2,DI3,DI4

the third line display the DI1~DI4 status.1 is instead for DI on,0 is instead for off

DO indicate:

the second line display the 1, 2,it means the DO1,DO2.

the third line display the DO1~DO2 status.1 is instead for DI on,0 is instead for off

3.3.2 Zone 2 display:

Total 6 pages to display:

Total phase power factor, separated phase power factor, separated active power, separated reactive power, separated apparent power, total power

Short press 【▲】 to check different page. Notice: under 3P3L,it doesn't display the separated phase power factor and separated phase power page.

0.992 PF 50.03 Hz	A 0.992 B 0.992 PF C 0.992	A 0.992 kW B 0.992 C 0.992

Total ... ... frequen... ...

0.992
0.992 kvar
0.992

0.992
0.992
0.992 kVA

0.992 kW
0.992 kvar
0.992 kVA
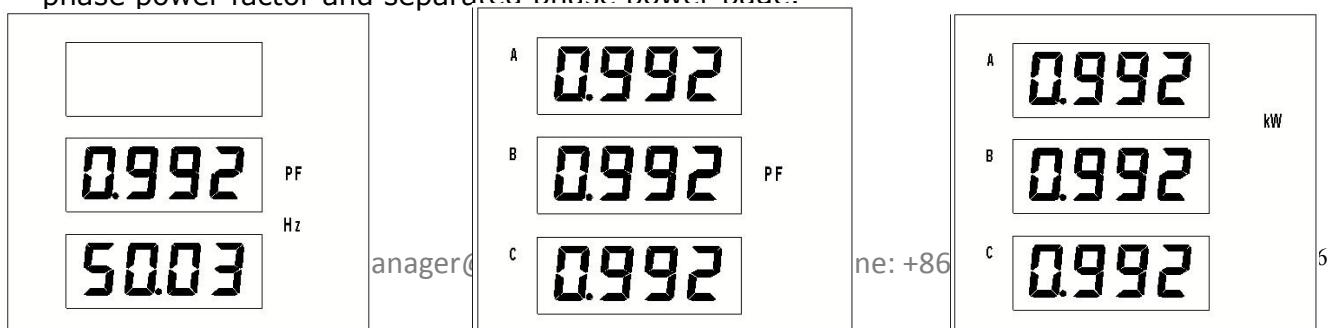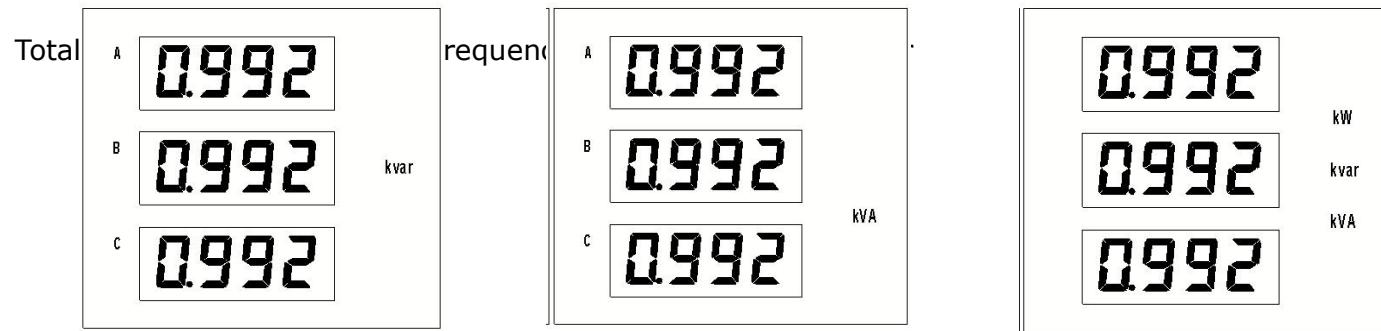
Separated phase reactive power   Separate phase apparent power   Total phase active/reactive/apparent power

Fig.3.3   Zone 2 display

3.3.3 Zone power degree display:
Total 10 pages. Short press ENTER button to check:

Total active energy absolute
Total reactive energy absolute
Total active energy +
Total active energy –
Total reactive energy +
Total reactive energy –
Reactive 4 phase energy

EP
1000
00.03

E9
1000
00.03

EP.In
1000
00.03

Total active energy absolute   Total reactive energy absolute   Total active energy +

EP.oΓ	E9.l n	E9oΓ
0000	1000	0000
00.00	00.03	00.00

Total active energy -   Total reactive energy   Total reactive energy -

E9.l	E92	E93	E94
0000	0000	0000	0000
00.00	00.00	00.00	00.00
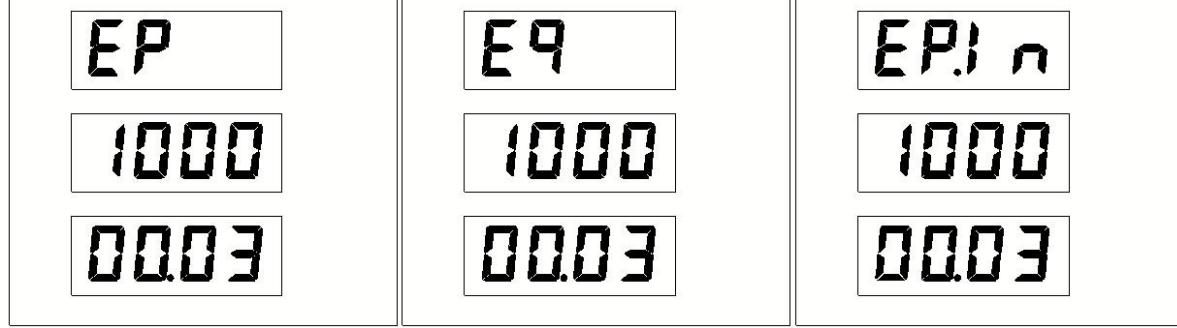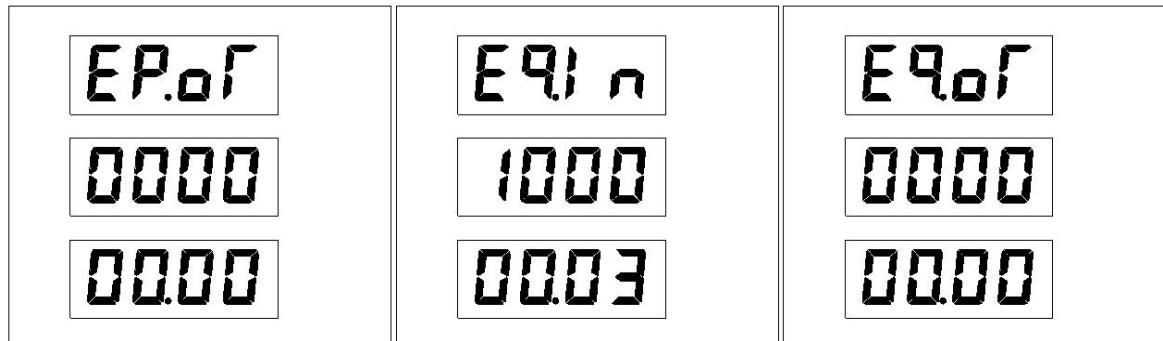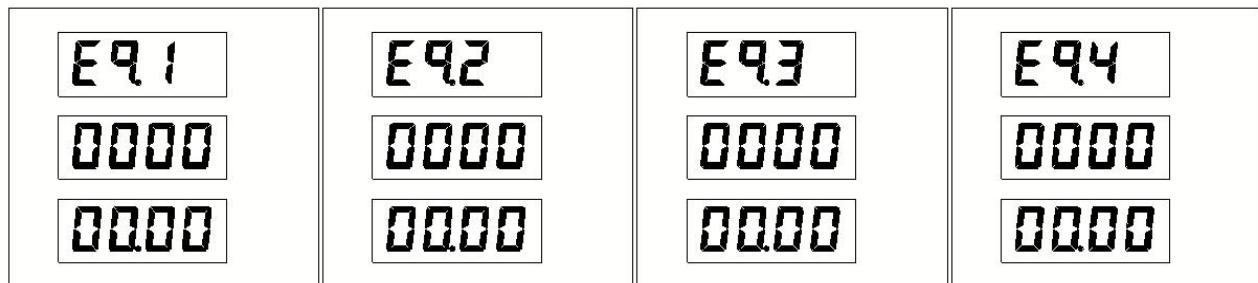
Phase 1 reactive energy   Phase 2 reactive energy   Phase 3 reactive energy   Phase 4 reactive energy

3.3.4 communication mark
When power meter receive data or transfer data the COM indicator lamp will light

4.LCD screen

4.1 Illustration of the LCD screen

Introduction:

1.Current parameter:

U:voltage

I:current

F:frequency and power factor

P/Q/S: power

2.Max.& Min. value

3.Three phase unbalance factor

4.Load:

Capacitance load(upper)

Inductive load(below)

5.Electrical degree:

Lmp:depleting

Exp:issue

Total:total

6.Time

7.DI condition

8.DO condition

9.Units:

Current:A KA

Voltage:V KV

Power factor:PF

Frequency:Hz

Active power:KWA

Apparent power:KVA

Active electric energy:KWh

Reactive electric energy:Kvarh

Three phase unbalance degree:%

10.Harmonic distortion rate

11.Current load rate

12.Communication condition
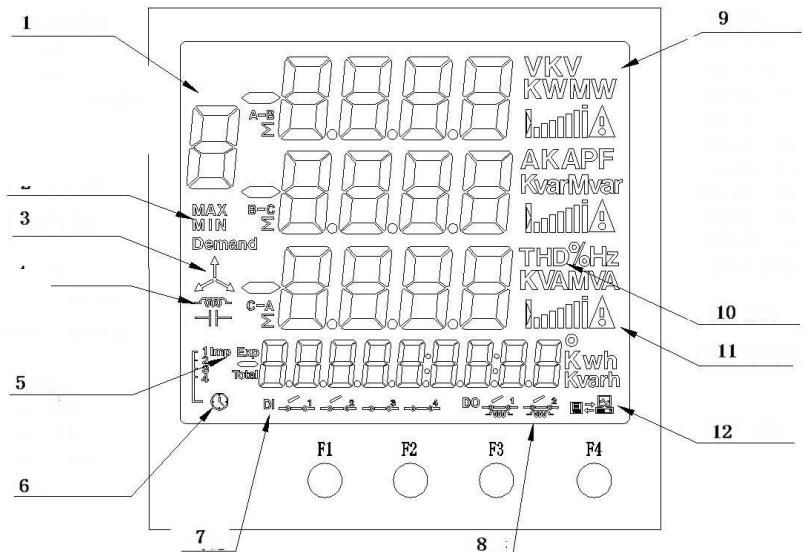
Fig.4.1 Screen display

4.2 Testing mode

4.2.1 Zone 1: total 3 pages. Short press ESC button to check the different pages
(under the 3P3L,it doesn't display the phase voltage page and line voltage doesn't display Uca
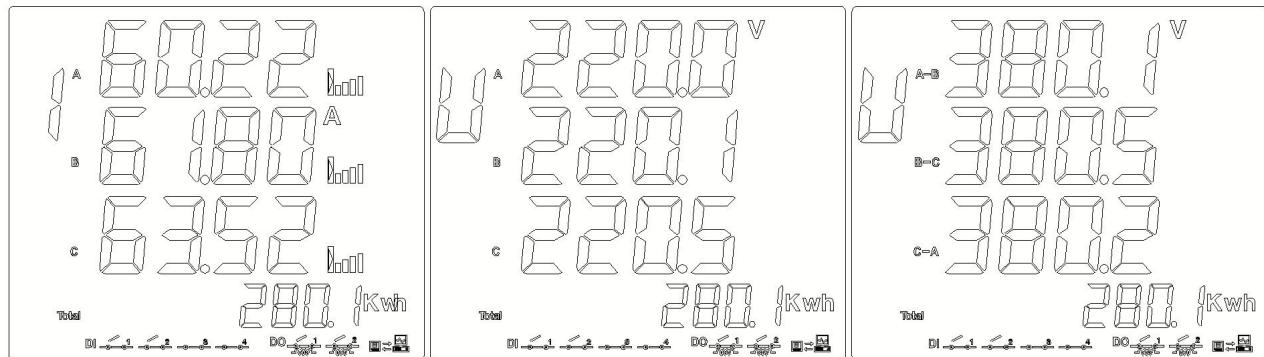
Fig.4 separated phase current   Separated phase voltage   Separated line voltage

4.2.2 Zone 2:total 6 pages
Short press 【▲】to check different page
(under the 3P3L ,it doesn't display separated phase power factor and separated power)
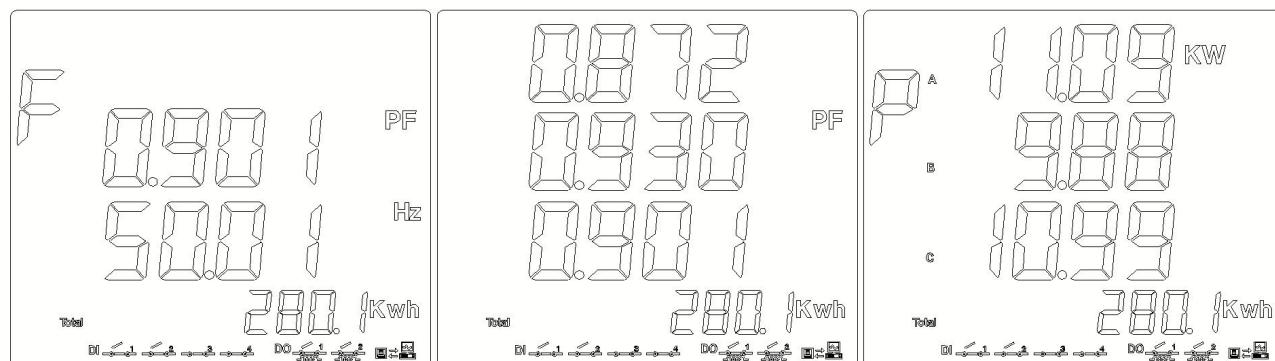
Fig.5 total power factor/frequency   separated phase power factor   separated phase active power
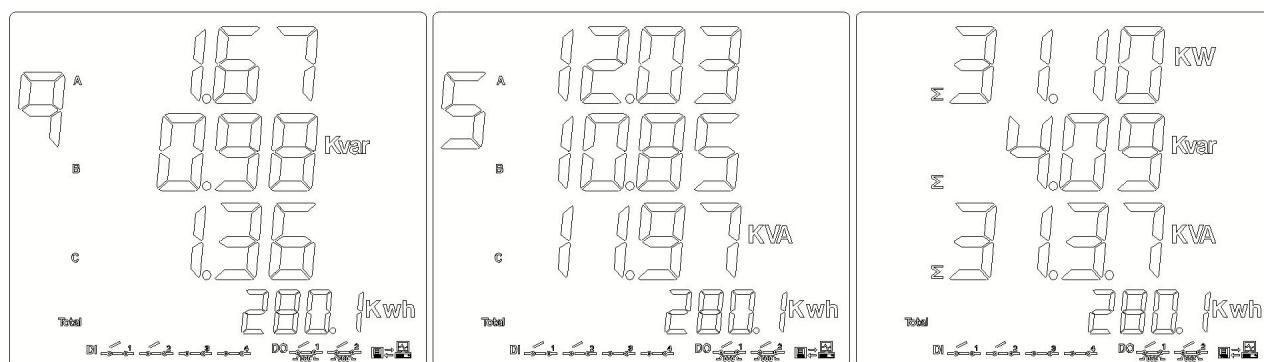
Separated reactive power   Separated apparent power   total phase active/reactive/apparent power

4.2.3 Zone 2:total 10 pages

Short press ENTER button to check

The degree freeze doesn't effect the data display. The display data real time display.

After degree freeze, the data can't update when modbus reading. After data unfreeze, the modbus will read the real time data.

The active energy unit is kWh, the reactive energy unit is kvarh.

Active energy absolute	2802 Kwh
Reactive energy absolute	572 Kvarh
Total active energy+	280.1 Kwh
Total active energy-	0.1 Kwh
Total reactive energy+	50.2 Kvarh
Total reactive energy-	70 Kvarh
Phase 1 reactive	30.7 Kvarh
Phase 2 reactive	195 Kvarh
Phase 3 reactive	32 Kvarh
Phase 4 reactive	38 Kvarh
Phase 4 reactive	30.7 Kwh
Tip period energy	195 Kwh
Peak period energy	32 Kwh
Normal period energy	38 Kwh

4.2.4 communication mark

When the power meter receive the data from master computer, below mark will appear.
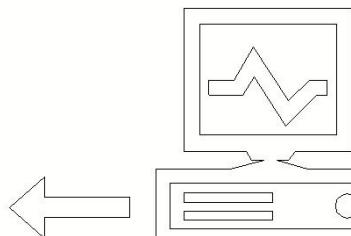
Data receiving mark   Data transferring mark
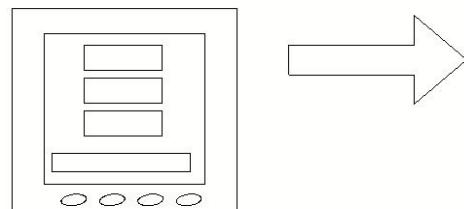
4.2.5 DI DO mark

DI1 off, DI2 on

DO1 off, DO2 on
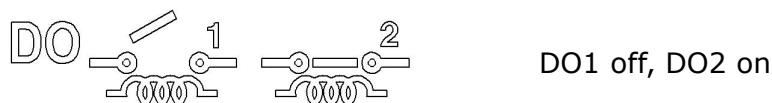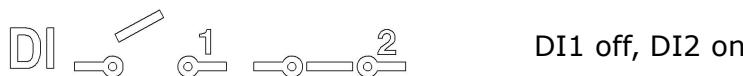
4.3 Setting mode

Long press ENTER to enter the setting mode.

First enter the password. Default is 0000,then short press ▲(+function) to choose the item.
Long press ENTER to enter the sub-menu and choose the details entry or enter the value.
Long press ENTER to enter, long press ESC to exit and auto go back.

When enter the details value, short press ENTER to move to the position that need to modify.
When it's shine, short press ▲(+function) to modify the value.
Long press ENTER to display whether need save. Long press ENTER to confirm or ESC to exit

If the input value is out of range, it will display ERRn.

Data storage:
After modify the parameter, user could operate as below to save.
In the pic., we give example to modify the connection mode to the 3 Phase 4 Wire and save.
Other condition is same.

Steps:
● After modify, long time press ENTER ,it will show 'Save or not', long press ENTER, screen will display 'Yes' and this will mean save successfully. Or long time press ESC to display NO to exit and back to previous menu.
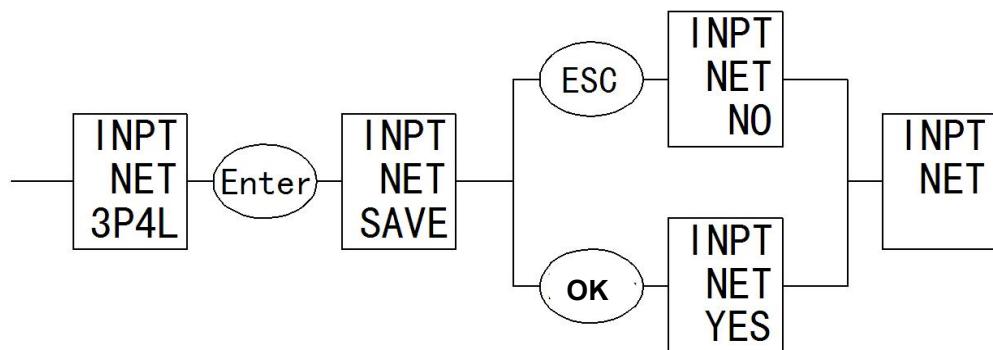
Samples:

- Modify CT1,CT2,PT1,PT2

Set voltage rated primary PT1 value as 35KV,rated secondary PT2 value as 100V.

PT1 rated value = set value x10

Set voltage rated primary PT1 value as 35KV,modify the rated value as 3500 as below reference FIG.
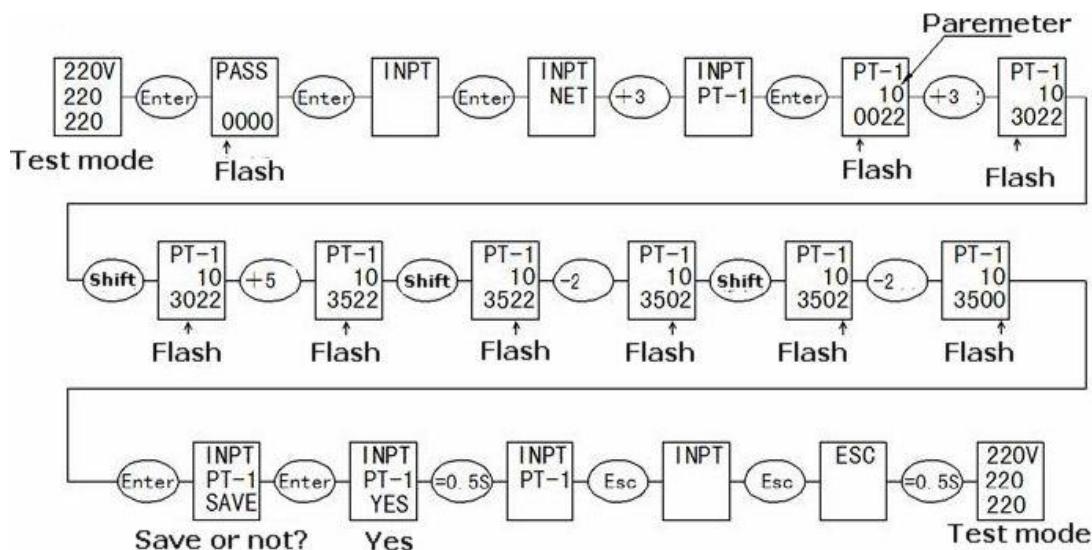
- Set voltage rated secondary PT2 value as 100V,refer below
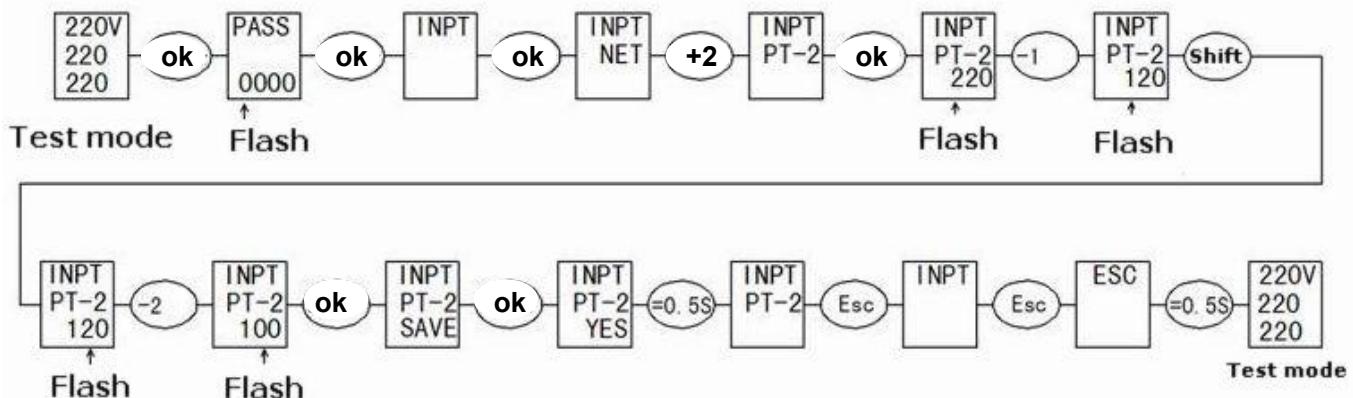
- Modify wiring mode

Change the connection mode from 3 Phase 4 Wire to 3 Phase 3 Wire.

Testing mode   flash

Testing mode
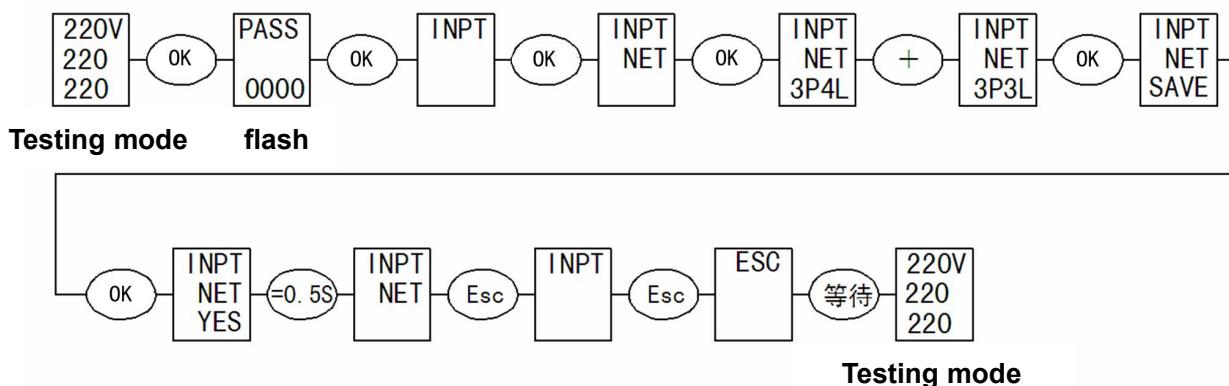
● Analog value output (valid when the model support Analog output)
  Relation power parameter setting. Relationship sheet as below.

Type value	Related power parameter	Unit	Type value	Related power parameter	Unit
0	A phase current	A	14	C phase active power	kW
1	B phase current	A	15	A phase reactive power	kVar
2	C phase current	A	16	B phase reactive power	kVar
3	A phase phase voltage	V	17	C phase reactive power	kVar
4	B phase phase voltage	V	18	A phase apparent power	kVA
5	C phase phase voltage	V	19	B phase apparent power	kVA
6	AB line voltage	V	20	C phase apparent power	kVA
7	BC line voltage	V	21	Total power factor	
8	CA line voltage	V	22	A phase power factor	
9	Total active power	kW	23	B phase power factor	
10	Total reactive power	kVar	24	C phase power factor	
11	Total apparent power	kVA	25	Frequency	Hz
12	A phase active power	kW	25~9999	Invalid	
13	B phase active power	kW			

● Low and high setting:
Low end &high end setting range is -9999~9999,press ESC to shift the plus and minus sign.

Analog value calculation method:
Ao =4+16*(Value-AoL)/(AoH-AoL)
unit Ma

Power parameter calculation method:
Value = (Ao-4)*(AoH-AoL)/16+AoL
Ao is analog value
Value is related power parameter testing value

AoH is high-end terminal

AoH is low-end terminal

Setting item introduction:

First level menu	Second level menu		Third level menu
	Display	Explain	
INPT Signal input	NET	fan-in network	Optional:3P4L or 3P3L
	CT-1	rated primary current	Input：1~5000A
	CT-2	rated secondary current	Optional:5A/1A
	PT-1	rated primary voltage	Input：100~35kV
	PT-2	rated secondary voltage	Input：100~400V
CONN Communication	ADDR	Slave address	Input：1-254
	BAUD	Bit rate	Optional：24/48/96/192According bit rate： 2400/4800/9600/19200bps
	DATA	Data pattern	Optional：N82（None parity, 8 digit data,2 end bits）， E81（Dual parity，8 digit data,1 end bit）， O81（Odd parity，8 digit data,1 end bit）， N81（None parity，8 digit data,1 end bits）。
EPEQ Energy	CLR	Energy clear	Optional：YES/NO
SYS System	B.L	Back light	Input：0-30（0is defaulted to always light）
	PASS	Passport setting	input：0000-9999（default is 0000）
	RST	System reset	Reset the power meter
	SVer	Software version	-
Analog output (optional)	Types	Related parameter	0~9999
	AoL	Analog low end	LCD：-9999~9999 LED：-1999~9999
	AoH	Analog high end	LCD：-9999~9999 LED：-1999~9999
DO1 Relay1	TYPE	Relay output type	Optional：LEVE：lever output　PULS：impulse output
	PL.T	Impulse delay time	Input：1~200S
	TEST	Test / control	Select：ON：close the relay OFF：open the relay
DO2 Relay 2	TYPE	Relay output type	Optional：LEVE：lever output　PULS：impulse output
	PL.T	Impulse delay time	Input：1~200S
	TEST	Test / control	Select：ON：close the relay OFF：open the relay

Setting menu construction introduction:
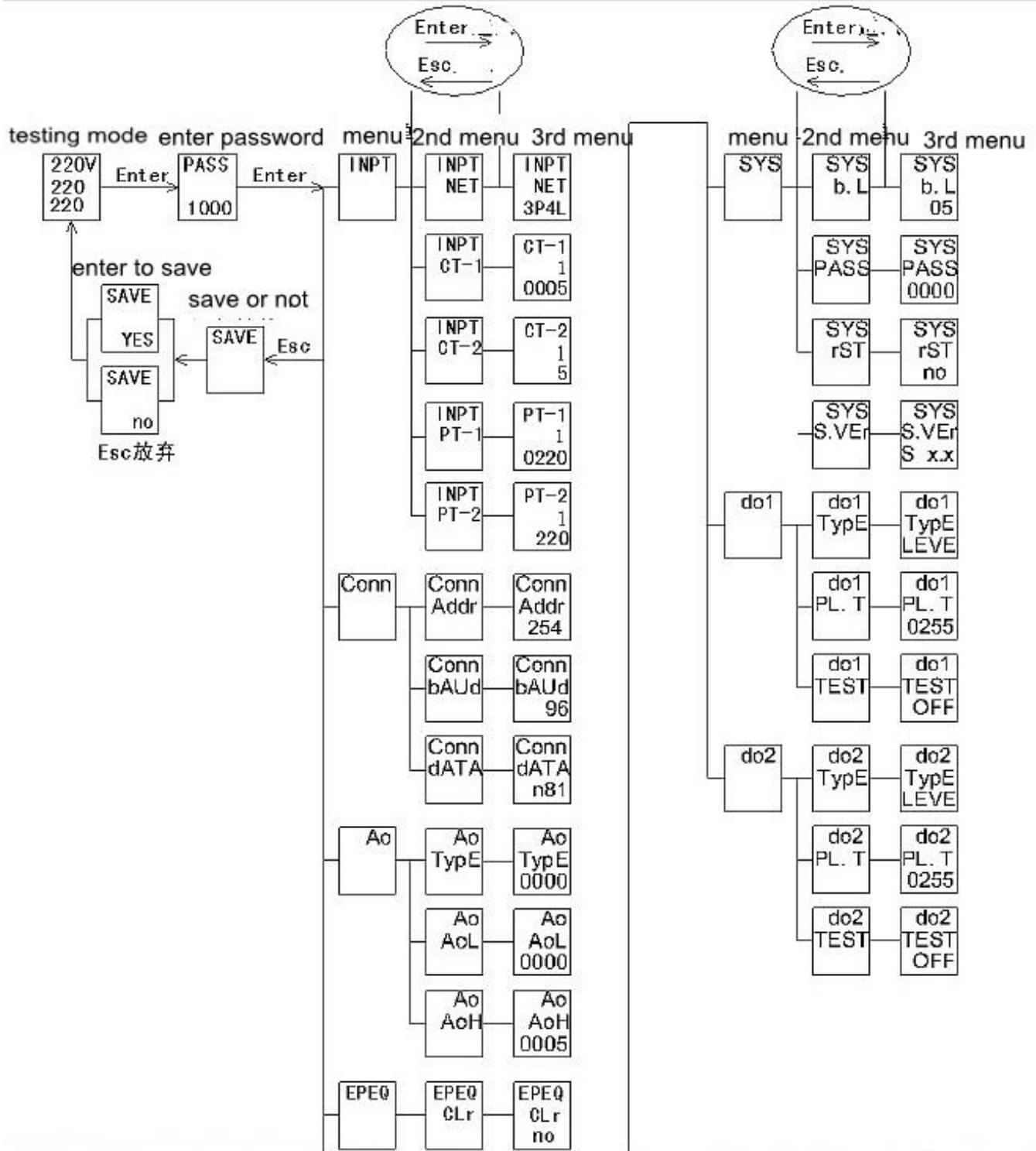
5. Communication

5.1 MODBUS protocol

MODBUS-RTU communication protocol is common protocol which is master-slave responding connection. Master station transmit signal and address some terminal equipment. The terminal equipment transmit the responding signal to the master station.

5.2 Communication protocol address table and introduction

5.2.1 Communication protocol address table
- Relay operation address table. Support the function code 01 read and 05 remote operation

Address	Type	Name	Register
00010	RW	PL1	1
00011	RW	PL2	1

Note: the register reading is 0x0000 means the register is off while 0x00ff is on.

- Digital quantity address table. Support the function code 02 read

Address	Type	Name	Register
10100	RO	DI1	1
10101	RO	DI2	1
10102	RO	DI3	1
10103	RO	DI4	1

- System information address table. Support the function code 03,04 read and the function code06,10 setting

Address	Type	Name	Value range	Remark	Register
40010~40017	RO	Reserved			
40025	RW	Password	0000~9999	Default:0000	1
40030	RW	Communication address	1~254	Default:254	1
40032	RW	Communication bit rate	1~7	Default:5	1
40034	RW	Communication verity mode	0~3	Default:0	1

40050	RO	Subsite status			1
40055	WO	Subsite setting			1
40057	WO	Power meter display interface setting	0		1
40060	RO	Electrical degree frozen and unfrozen state			1

- System parameter address sheet. Support function code 03,04 reading and function code 06,10 setting

Address	Type	Name	Value range	Remark	Register
40071	RW	Telemetering wiring method	1/3	default：1	1
40073	RW	PT rated primary voltage	100~35KV	default：	2 （Sequential
40074	RW	PT rated secondary voltage	100~400V	220/220	Write)
40076	RW	bit14-bit0 instead of CT rated primary current bit15=0/1 instead secondary is 5A/1A	rated primary current: 1~5000A	default: 0x5 （5：5）	1
40080	RW	Relay 1 output function setting	0~1	default：1	1
40082	RW	Relay 2 output function setting	0~1	default：1	1
40088	RW	Relay 1 impulse width	1~200s	default：2	1
40090	RW	Relay 2 impulse width	1~200s	default：2	1
40096	RW	Backlight light time	0~30 minutes	default：5	1
40109	RW	Analog related power parameter	0~9999	default:0	1
40110	RW	Analog high end	LCD：-9999~9999 LED：-1999~9999	default:5	1
40111	RW	Analog low end	LCD：-9999~9999 LED：-1999~9999	default:0	1

● Basic electric parameter address sheet. Support function code 03,04 reading.

Address	Type	Data definition	Register
40120	RO	Line voltage: Uab	1
40121	RO	Line voltage: Ubc	1
40122	RO	Line voltage: Uca	1
40123	RO	Average value of line voltage: ULLAvg	1
40124	RO	Phase voltage Uan	1
40125	RO	Phase voltage Ubn	1
40126	RO	Phase voltage Ucn	1
40127	RO	Average value of line voltage ULNAvg	1
40128	RO	Current Ia	1
40129	RO	Current Ib	1
40130	RO	Current Ic	1
40131	RO	Average value of current IAvg	1
40132	RO	Reserve read as 0	1
40133	RO	Total frequency（F）	1
40134	RO	Total power factor（PF）	1
40135	RO	Total active power（W）	1
40136	RO	Total reactive power（Q）	1
40137	RO	Total apparent power（S）	1
40138	RO	A phase power factor（PFa）	1
40139	RO	B phase power factor（PFb）	1
40140	RO	C phase power factor（PFc）	1
40141	RO	A phase active power（Wa）	1
40142	RO	B phase active power（Wb）	1
40143	RO	C phase active power（Wc）	1
40144	RO	A phase reactive power（Qa）	1
40145	RO	B phase reactive power（Qb）	1
40146	RO	C phase reactive power（Qc）	1
40147	RO	A phase apparent power（Sa）	1
40148	RO	B phase apparent power（Sb）	1
40149	RO	C phase apparent power（Sc）	1

*Note:

1)3 phase 3 wire, the data between 40122,40124~40127,40138~40149 is data invalid

2) The correspondence of above data and actual value is as below:

Voltage:U=(Ai/100)*(PT1/PT2)，Ai is a unsigned integer which unit is V

Current:I=(Ai/1000) *(CT1/CT2)，Ai is a unsigned integer which unit is A

Active power:P=Ai*(PT1/PT2)*(CT1/CT2)，Ai is signed integer which unit is W

Reactive power:Q=Ai*(PT1/PT2)*(CT1/CT2)，Ai is signed integer which unit is var

Apparent power:S=Ai*(PT1/PT2)*(CT1/CT2)，Ai is a unsigned integer which unit is VA

Power factor:PF=Ai/1000,Ai is a signed integer with no unit

Frequency:F=Ai/100, Ai is a unsigned integer which unit is Hz

3) Average value computing method

Line voltage average value:

3P4W:ULLAvg = (Uab + Ubc + Uac）/3

3P3W:ULLAvg = (Uab + Ubc）/2

Phase voltage average vaule:

3P4W:ULNAge = (Uab + Ubc + Uac）/3

3P3W:ULNAvg = 0

Current average value:

3P4W:IAvg = (Ia+Ib+Ic)/3。

3P3W:IAvg = (Ia+Ib+Ic)/3

- Electrical degree address sheet.Support function code 03,04 reading and function code 10 setting.

Address	Type	Data definition	Register
40200	RW	Total active power absolute electrical degree cumulative value	2
40202	RW	Total reactive power absolute electrical degree cumulative value	2
40216	RO	Total active power(+) absolute electrical degree cumulative value	2
40226	RO	Total active power(-) absolute electrical degree cumulative value	2
40236	RO	Total reactive power(+) absolute electrical degree cumulative value	2
40246	RO	Total reactive power(-) absolute electrical degree cumulative value	2
40256	RO	Ⅰ phase total reactive power absolute electrical degree cumulative value	2
40266	RO	IV phase total reactive power absolute electrical degree cumulative value	2
40276	RO	II phase total reactive power absolute electrical degree cumulative value	2
40286	RO	III phase total reactive power absolute electrical degree cumulative value	2

*Note:

1) The correspondence of above data Ai and actual value is as below:

Active energy:Ep=Ai/100，Ai a unsigned long integer(0~999,999,999),unit is kWh

Reactive energy:Ep=Ai/100，Ai a unsigned long integer(0~999,999,999),unit is kvarh

2） Table bottom setting don't effect the frozen degree data

- Remote signaling and over limit alarm address table.Support function code 03,04 reading

Address	Type	Data definition	Register
40520	RO	Digital input remote signaling	1

- System parameter quick reading address table, support function code 03,04 reading

Address	Type	Data definition	Register
42000	RO	Remote signal 1	1
42001	RO	Reserve (reading as 0)	1
42002	RO	Current Ia	2
42004	RO	Current Ib	2
42006	RO	Current Ic	2
42008	RO	(reserved, reading as zero)	2
42010	RO	Line-to- line voltage Uab	2
42012	RO	Line-to- line voltage Ubc	2
42014	RO	Line-to- line voltage Uca	2
42016	RO	Phase voltage Uan(valid in 3-phase,4-wire system)	2
42018	RO	Phase voltage Ubn(valid in 3-phase,4-wire system)	2
42020	RO	Phase voltage Ucn(valid in 3-phase,4-wire system)	2
42022	RO	Frequency（F）	2
42024	RO	Total active power（W）	2
42026	RO	Total reactive power（Q）	2
42028	RO	Total apparent power（S）	2
42030	RO	Total power factor（PF）	2
42032	RO	Total active electric energy（Ep）	2
42034	RO	Total reactive electric energy（Eq）	2
42036	RO	CT	1

 *Note:

1) In the 3-phase 3-wire system, the data in 42014~42020 are invalid and value is 0

2)The corresponding relationship of the above data(Ai) and the actual data:

Voltage: $U = (Ai/10)$, Ai denote unsigned integer, unit is V

Current: $I = (Ai/1000)$, Ai denote unsigned integer, unit is A

Active power: $P = Ai/10$, Ai denote signed integer, unit is W

Reactive power: $Q = Ai/10$, Ai denote signed integer, unit is var

Apparent power: $S = Ai/10$, Ai denote unsigned integer, unit is VA

Power factor $PF = Ai/1000$, Ai denote signed integer, no unit

Active electric energy: $Ep = Ai/100$,Ai denote unsigned long integer(0~999,999, 999),unit is kWh

Reactive electric energy: $Eq = Ai/100$,Ai denote unsigned long integer(0~999,999,999),unit: Kvarh

5.2.2 Register address introduction

Hardware version register 40010:stored in the program storage
Software version register 40011:stored in the program storage
Product mode no.40012:stored in the program storage
Product serial no. 40013~40017:download in the E2PROM after production inspection

● Communication baud rate(40032) from 1 to 7, as shown below:

Communication bit rate	Introduction
1	Reverse (setting void)
2	Reverse (setting void)
3	2400 bps
4	4800 bps
5	9600 bps
6	19200 bps
7	Reverse (setting void)

● Communication transfer format(40034):range 0~3,this mean the verify mode

Verify mode code	Introduction
0	No parity verify,2 end bit
1	Even verify,2 end bit
2	Odd verify,1 end bit
3	No parity verify,1 end bit

● Register for Slave station status (40050)

Bit site	Definition	Default	Note
Bit0	Remote signal shift sign	0	
Bit1	Reserved	0	
Bit2	Reserved	0	
Bit3	Reserved	0	
Bit4	Reserved	0	
Bit5	Reserved	0	
Bit6	Reserved	0	
Bit7	Reserved	0	
Bit8	Reserved	0	
Bit9	Reserved	0	
Bit10	Reserved	0	
Bit11	Reserved	0	
Bit12	Reserved	0	
Bit13	Reserved	0	
Bit14	Reserved	0	
Bit15	Reserved	0	

● Register for Slave station settings (40055)

Bit site	Definition	Default
Bit0	Reserved	0
Bit1	Reserved	0
Bit2	Clear all the power degree	0
Bit3	Reserved	0
Bit4	Reserved	0
Bit5	Reserved	0
Bit6	Reserved	0
Bit7	Reserved	0
Bit8	Freeze all the electric degree	0
Bit9	Unfreeze all the electric degree	0
Bit10	Reserved	0
Bit11	Clear demand	0
Bit12	Reserved	0
Bit13	Reserved	0
Bit14	Reserved	0
Bit15	Reset device	0

*Note:

1) It needn't to return messages when broadcast freeze or unfreeze. After sending the freeze command by the upper computer, all of the reading electric energy values are equal to the electric accumulated value of the frozen moment, but the internal measurement of electric energy value continues to accumulate. If you want to refresh the reading total value of electric energy, the upper computer must sending the unfreeze command.

System display inner electric energy, but not freeze power degree

● Power meter display setting 40057:

40057 high byte: electrical degree page setup

Code	Introduction
0	No operation
1	Total active power absolute electrical degree cumulative value
2	Total reactive power absolute electrical degree cumulative value
3	Total active power(+) absolute electrical degree cumulative value
4	Total active power(-) absolute electrical degree cumulative value
5	Total reactive power(+) absolute electrical degree cumulative value
6	Total reactive power(-) absolute electrical degree cumulative value
7	Ⅰ phase total reactive power absolute electrical degree cumulative value
8	II phase total reactive power absolute electrical degree cumulative value
9	III phase total reactive power absolute electrical degree cumulative value
10	IV phase total reactive power absolute electrical degree cumulative value

40057 low byte: basic display page setup

Code	Introduction
0	No operation
1	Three phase current
2	Reserved
3	Three phase phase- neutral voltage
4	Three phase line-line voltage
5	Reserved
6	Frequency
7	Power factor
8	Three phase power factor
9	Three phase active power
10	Three phase reactive power
11	Three phase apparent power
12	Total active power, total reactive power, total apparent power

- Electric degree frozen/unfrozen state register 40060

BIT0 means the degree status of frozen/unfrozen, 1 is frozen,0 is unfrozen

- Remote signaling connection mode 40071:1~5 as below:

Connection mode no.	Introduction
1	3 Phase 4 wire 3CT(3P4W/3PT+3CT)
2	Reserve (No setting)
3	3 Phase 3 wire 3CT(3P3W/3PT+3CT)
4	Reserve
5	Reserve (No setting)

- Backlight time (40090):0~30 minutes.0 instead for Normal light.

- 2-ch digital value input(40520):reading the remote signaling status. Low byte 0~1 digit is the first and second remote signal input, other digit is 0

Digit of the byte	7	6	5	4	3	2	1	0
40520 high byte	0	0	0	0	0	0	0	0
40520 low byte	0	0	0	0	DI4	DI3	DI2	DI1

- Quick remote signaling checking register –register 42000

Digit of the byte	7	6	5	4	3	2	1	0
42000 high byte	0	0	0	0	0	0	0	0
42000 low byte	0	0	0	0	DI4	DI3	DI2	DI1