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EPM300A-1AY

Compteur d'énergie à fonctions multiples

Mode d'emploi

Attention

L'utilisateur doit lire attentivement ce manuel avant de se préparer à installer, utiliser, servir ou entretenir. Des mots spéciaux figurent ci-dessous dans tout le manuel ou sur les instructions à suivre pour rappeler aux personnes potentiellement dangereuses ou pour marquer les points importants.

DANGER
‘⚠DANGER ’ MONTRE UN DANGER DIRECT. SI ON NE PEUT ÊTRE ÉVITÉ, CELA CONDUIRA À LA MORT IMMÉDIATE OU À DES BLESSURES GRAVES!

ATTENTION
‘⚠ATTENTION: L’ AVERTISSEMENT MONTRE UN RISQUE POTENTIELLEMENT DANGEREUX.S’ IL NE PEUT ÊTRE ÉVITÉ, CELA PEUT ENTRAÎNER LA MORT OU UNE MAUVAISE BLESSURE!

REMARQU
'⚠AVIS 'MONTRE UN DANGER POTENTIEL. SI VOUS NE POUVEZ PAS ÊTRE ÉVITÉ, CELA PEUT ENTRAÎNER DES BLESSURES PETITES OU MODÉRÉES!

REMARQU
«AVIS» MONTRE UN DANGER POTENTIEL.S’ IL NE PEUT ÊTRE ÉVITÉ, IL POURRAIT ENTRAÎNER DES DOMMAGES DIRECTS À LA PROPRIÉTÉ

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

EPM300A-1AY is intelligent mutilpurpose power which integrates the remote measuring and remote communication functions.

This meter could test, display and Remote Transfer all the common power parameters,2-ch digital inputs. 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 Load type

Indicate the current load type:

Capacitive load or Inductive load

1.2.1.3 Remote transfer

2DI real time switch-status monitoring

1.2.1.4 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

Input Test Display		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 display ● Modbus communication to change the display interface
Digital input	Input		2-ch input, Opto-coupler isolation
	Isolation Voltage		2500Vrms
Comm.	Interface		RS485
	Protocol		ModBUS-RTU
	Baud rate		2400/4800/9600/19200bps Odd parity check, even parity check, none parity check
Working power	Working voltage		AC:85V～265V or DC:100V～360V
	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×71 mm
	Weight		0.4kg

1.3. Technical Indicators

ITEMS			DETAILS
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

1.4.EMC Standard

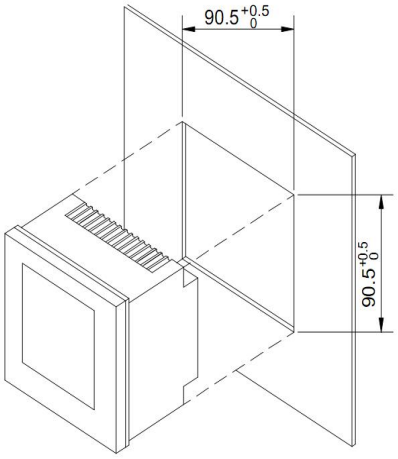
TEST ITEMS	LEVEL	STANDARD
high frequency anti-jamming test	Ⅲ, Ⅳ	GB/T 15153.1/1998
electrostatic discharge anti-jamming test	Ⅲ	GB/T 15153.1/1998
electrical fast transient anti-jamming test	Ⅳ	GB/T 17626.4-2008
surge anti-jamming test	Ⅳ	GB/T 15153.1/1998
power frequency magnetic fields anti-jamming test	Ⅳ, Ⅴ)	GB/T 17626.8-2006

2.Installation

2.1 Installation

2.1.1 Dimension of EM 300A

- Meter dimension size:96*96*71mm
- Panel size:96*96mm
- Slot size:90.5 $_{-0.0}^{+0.5}$ mm × 90.5 $_{-0.0}^{+0.5}$ mm
- Min. Side size is 80mm



2.1.2 Installation steps:

- Slots on the switchgear should be 90.5 $_{-0.0}^{+0.5}$ mm × 90.5 $_{-0.0}^{+0.5}$ mm
- Take down the fixed mount of the meter
- Put the meter into the slots and insert the fixed mount

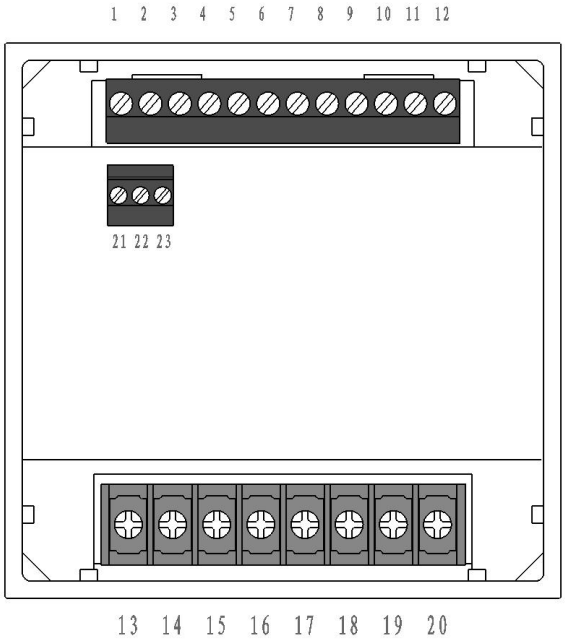


Fig.1 Installation schematic diagram

Notice

Avoid close to the system with electromagnetic interference

2.2 Terminal wiring

2.2.1 Terminal definition

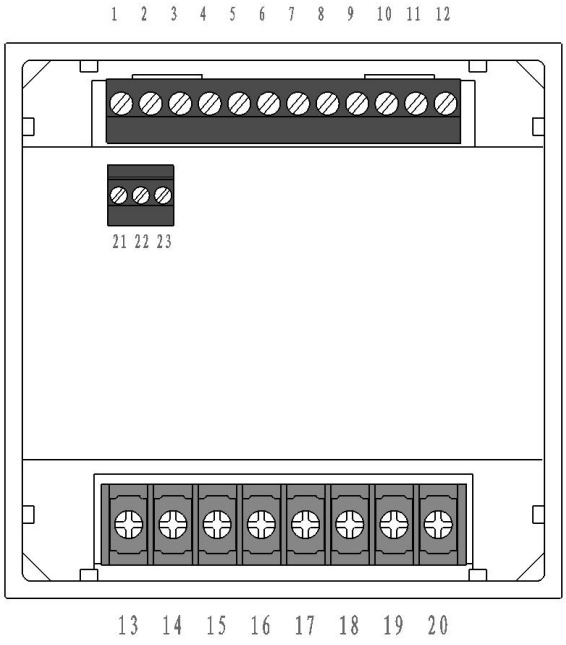


Fig.2 Terminal definition

Terminal definition LIST

VOLTAGE INPUT	1	UA	CURRENT INPUT	13	I11
	2	UB		14	I12
	3	UC		15	I21
	4	UN		16	I22
POWER SUPPLY	5	L/+		17	I31
	6	N/-		18	I32
	7	PE		19	I41
	8	NC		20	I42
	9	NC	COMMUNICATION	21	A+
TELECOMMAND	10	DI1		22	B-
	11	DI2		23	SHLD
	12	COM		24	

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

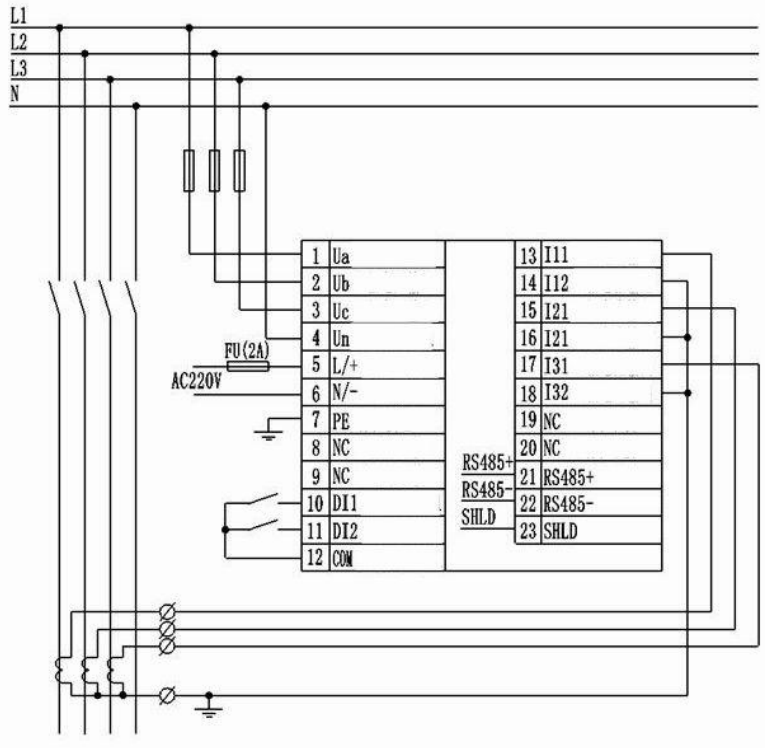


Fig.2.3.1.1 3 phase 4 wire 3PT-3CT wiring

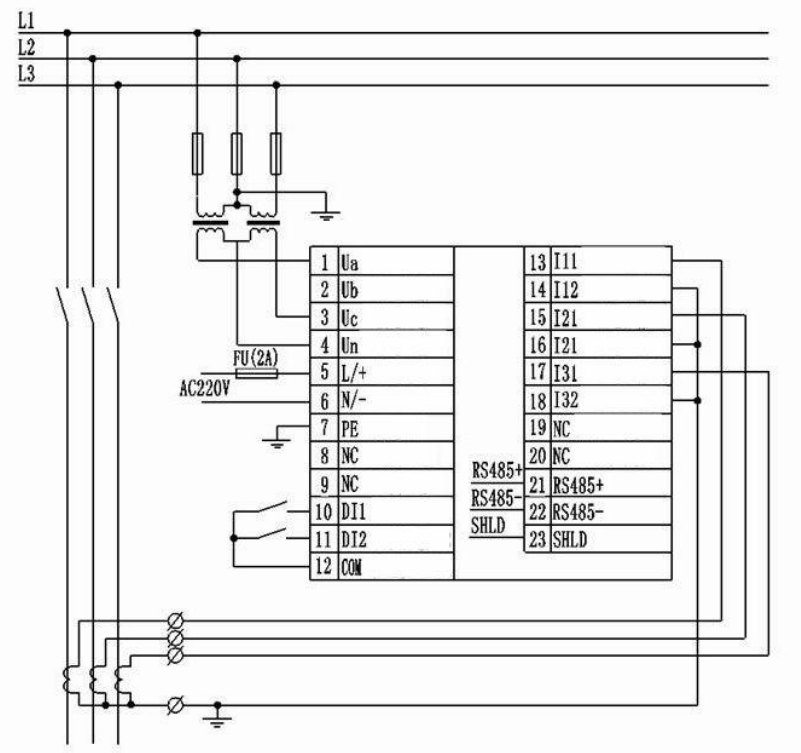


Fig.2.3.1.2 3 phase 3 wire 2PT-3CT wiring

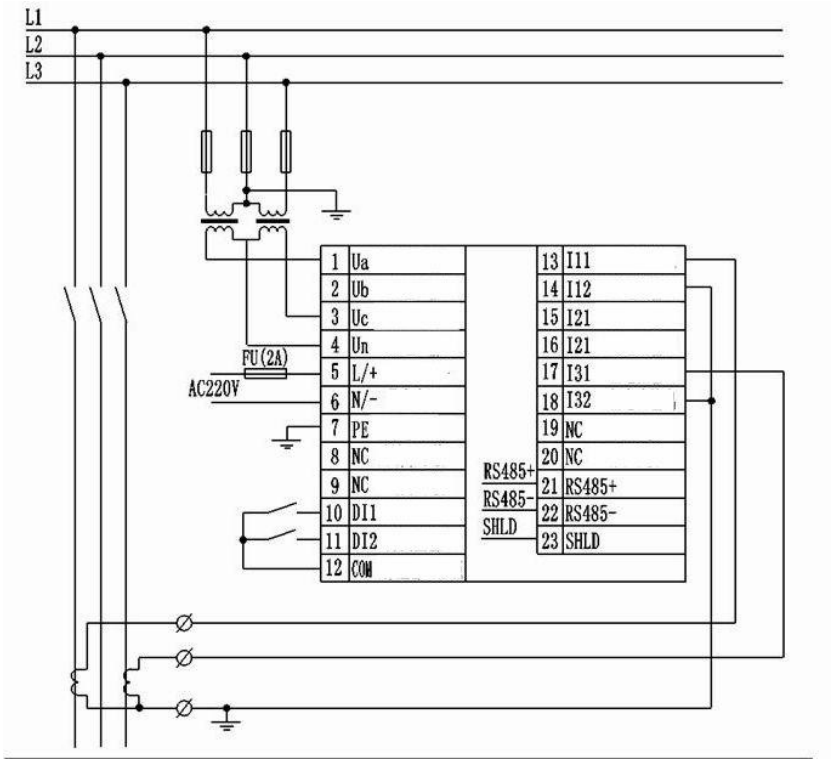


Fig.2.3.1.3 3 phase 3 wire 2PT-2CT voltage wiring

Fig.2.3.1.1 The connect method should be setted as 3 phase 4 wire
Fig.2.3.1.2&2.3.1.3 should be 3 phase 3 wire

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

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.2.3.2.2

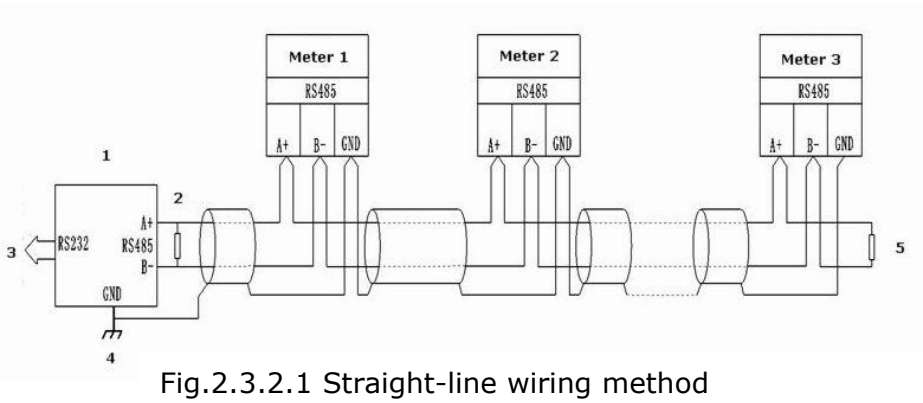


Fig.2.3.2.1 Straight-line wiring method

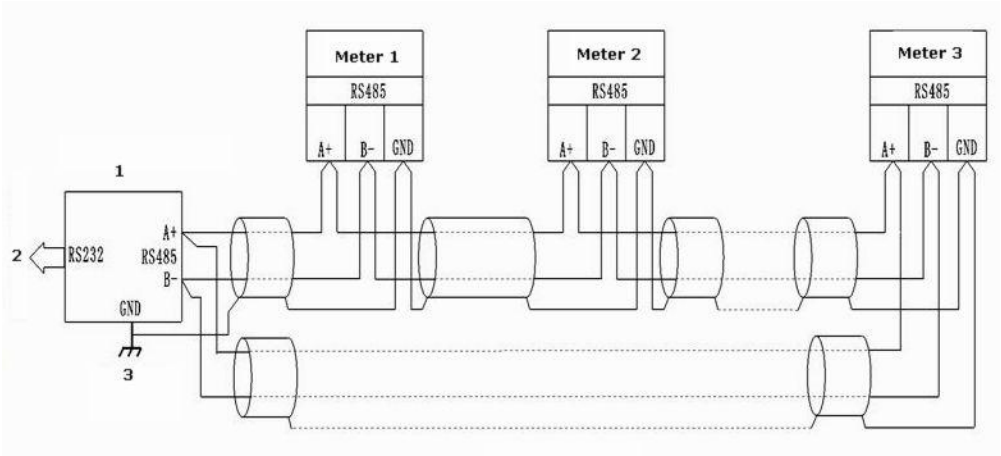


Fig.2.3.2.2 Loop wiring method

2.3.3 DI wiring

Monitoring the switch value and digital value of two branch nodes.Opto-isolated input.The isolated voltage is 1500VAC.Isolated 240DVC output from the inner supply input loop power for the branch nodes.The wiring diagram as below:

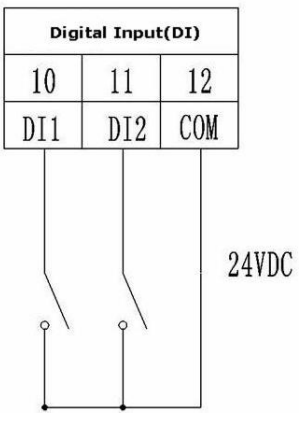


Fig.2.3.3 DI input

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.Operation guidance

3.1 Illustration of the screen display

Introduction:

1.Current parameter:

U:voltage

I:current

F:frequency and power factor

P/Q/S: power

2.Three phase unbalance factc

3.Load:

Capacitance load(upper)

Inductance load(below)

4.Electrical degree:

Lmp:depleting

Exp:issue

Total:total

5.DI condition

6.Units:

Current:A KA

Voltage:V KV

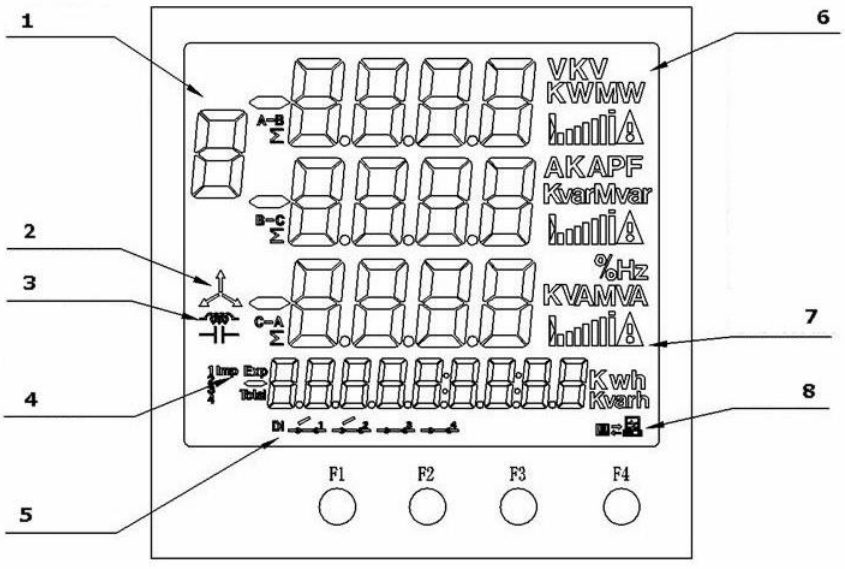


Fig.3.1 Screen display

Power factor:PF
Frequency:Hz
Active power:KWA
Apparent power:KVA
Active electric energy:KWh
Reactive electric energy:Kvarh
Three phase unbalance degree:% o
7.Current load rate
8.Communication condition

3.2 Buttons:

Introduction:There are total four buttons,F1,F2,F3,F4
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	-	F1	F2	F3	F4
Measure mode	Short press	Zone 1 switch	Zone 2 switch	Zone 3 switch	Energy switch
	Long press	Auto scan		Shift	
Setup mode	Short press		+	-	Shifting
	Long press	Esc			Enter

3.3 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 and current load rate,current unbalanced degree,phase voltage,wire voltage,voltage unbalanced degree.Short press F1 to choose different pages.*Pls notice,when 3 Phase 3 Wire,it can't display the voltage page,the wire voltage can't display the Uca.
Load rate indication:
Secondary current percentage rate of the CT2 setting value,from 0%~120%
When segregated current display,the load rate of all phase display.The function as below.
If over the CT2 setting value,the alarm mark will display.

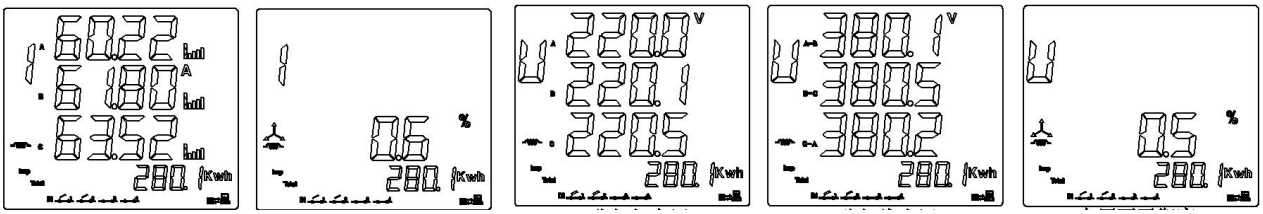


Fig.3.3.1.1 Segregated current Current unbalanced degree Segregated phase voltage Segregated wire voltage Voltage unbalanced degree

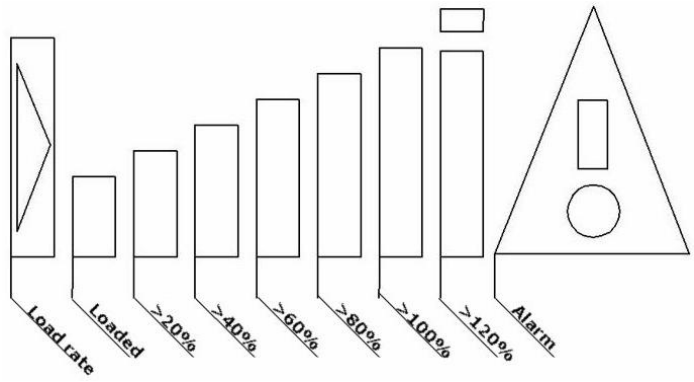


Fig.3.3.1.2 Load rate display

3.3.2 Zone 2 display:

Total 2 pages and display:

three phases power factor and frequency,segregated phase power factor.Short press F2 to check different pages.*Pls notice,under the 3 Phase 3 Wire,it can't display the segregated phase power factor.As fig.3.3.3

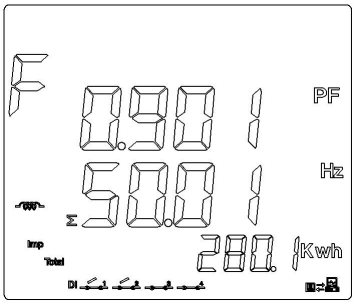
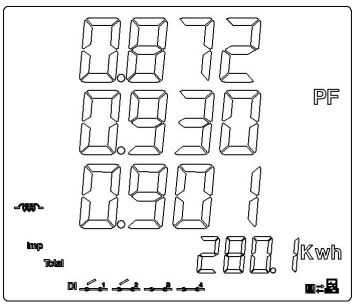


Fig.3.3.2 Three phases power factor/frequency



Segregated phase power factor

3.3.3 Zone 3 display:

Total 4 pages and display:

Segregated active power,segregated reactive power,segregated apparent power,total power(PQS).Short press F3 to check all the pages.*Pls notice when 3 Phase 3 Wire,it can only display the three phases total phase PQS page.As fig.3.3.4

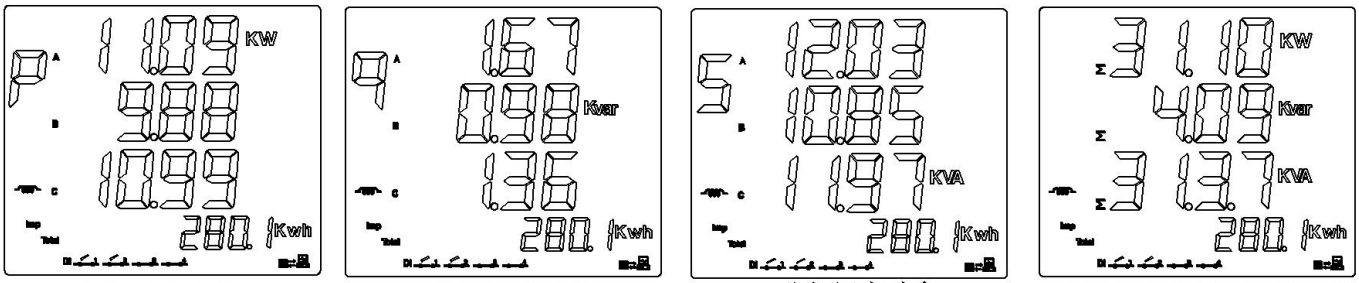


Fig.3.3.3 Segregated phase active power Segregated phase reactive power Segregated apparent power Three phases total active/reactive power

3.3.4 Energy display:
Short press F4 to check:
Positive total active energy
Reverse total active energy
Positive total reactive energy
Reverse total reactive energy
4 quadrants reactive energy
As fig.3.3.4

Freeze electrical degree don't effect the real-time display. The degree collected by the Modbus is not updated but will be real-time data after unfreeze.

Active energy absolute

Reactive energy absolute

Total active energy+

Total active energy-

Total reactive energy+

Total reactive energy-

Phase 1 reactive

Phase 2 reactive

Phase 4 reactive

Phase 3 reactive

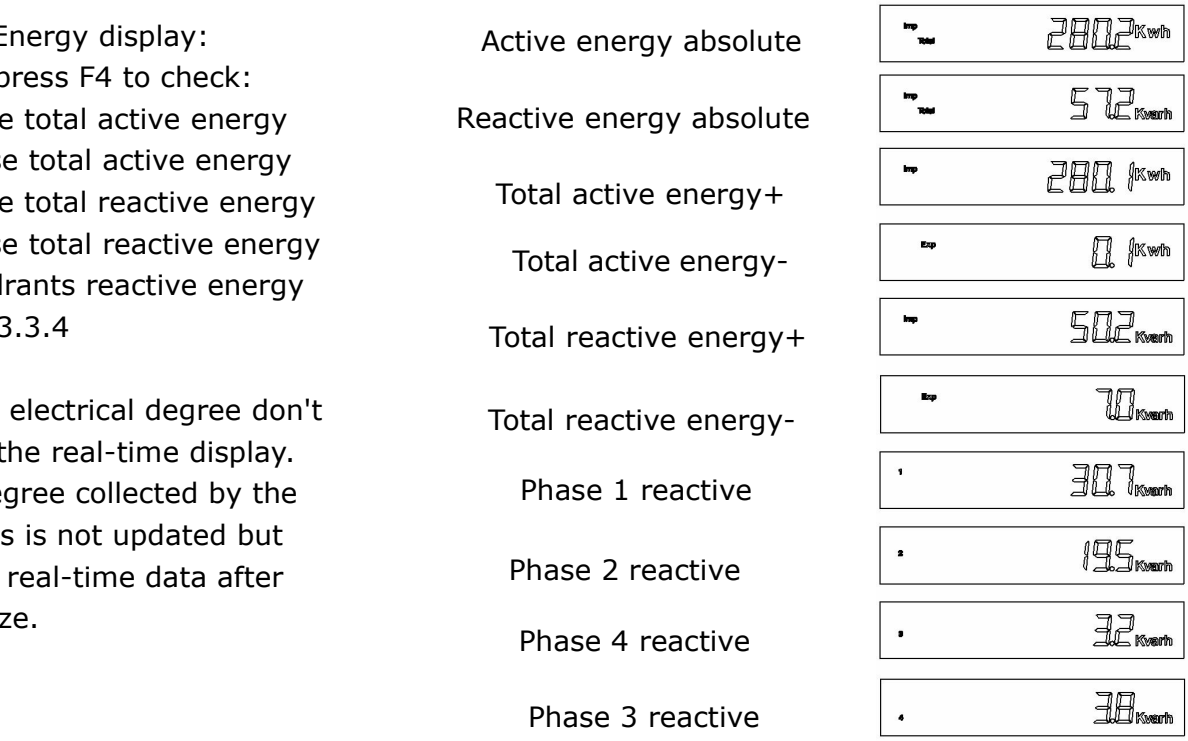


Fig.3.3.4 Display introduction

3.3.5 Communication mark instruments
When the meter receive the data from the master station,the display as below fig.3.3.5.1.
When the meter transfer date to the master station,the display as below fig.3.3.5.2

Fig.3.3.5.1 Data receiving

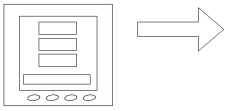


Fig.3.3.5.2 Data transferring

3.3.6 Switch quantity display
The switch quantity condition will display on the screen as fig.3.3.6
Here:

DI1 OPEN DI2 OPEN DI3&DI4 is not used.

Fig.3.3.6 Switch quantity condition display

3.4 Setting mode

Long press F4 to enter the setting mode.
First enter the password.Default is 0000,then short press F2(+function) &F3(-function) to choose the item.Long press F4 to enter the sub-menu and choose the details entry or enter the value.
Long press F4 to enter,long press F1 to exit and auto go back.
When enter the details value,short press F4 to move to the position that need to modify.When it's shine,short press F2(+function) or F3(-function)to modify the value.Long press F4 to enter,and will display 'save' for choose whether save or not.Long press F4 to save or long press F1 to exit.
When enter the exact value,short press F4 to choose the digital position that need to modify.When the target digital position shine,short press F2(+ function) or F3(- function) to modify.Long press F4 to confirm and screen will display whether to save.Long time press F4 to confirm and F1 to exit.If the enter value is out the fixed range,'ERRN' error information will display and ask to enter again.

3.4.1 Data storage:
After modify the parameter,we could do as below to save.Refer fig.3.4.1
In the pic.,we modify the connection mode to the 3 Phase 4 Wire and save.
Steps:

- After modify,long time press F4 to display the Save or not,long press F4,screen will display 'Yes' and this will mean save successfully.Or long time press F1 to exit and back to previous menu.

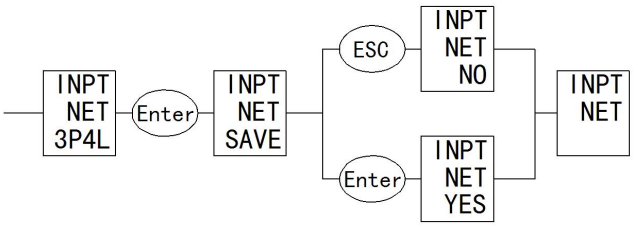


Fig.3.4.1 Parameter save

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.3.4.2

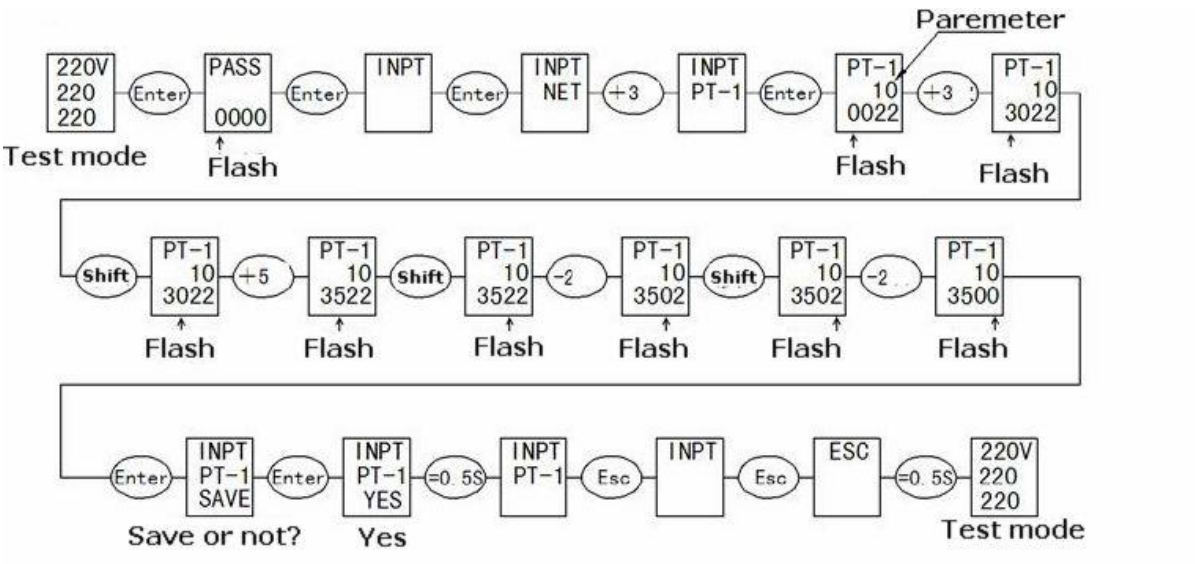


Fig.3.4.2 PT1 setting samples

Set voltage rated secondary PT2 value as 100V,refer fig.3.4.3

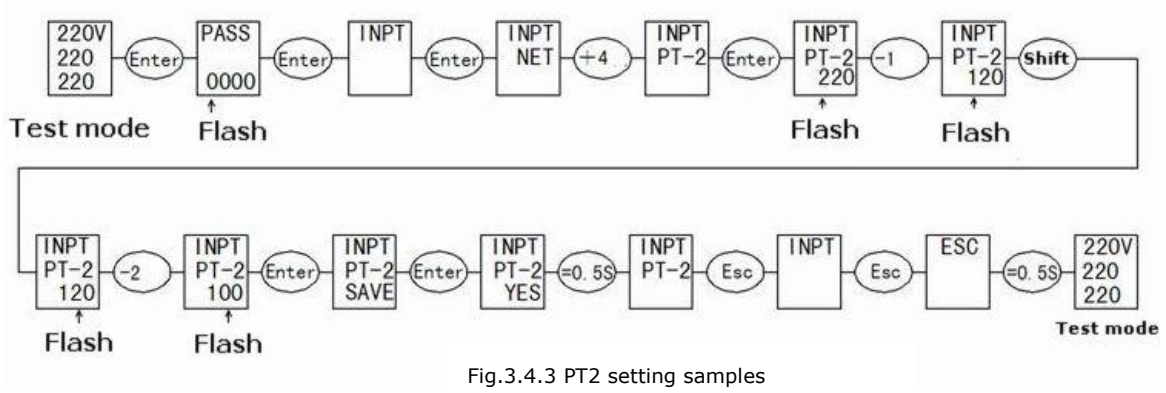


Fig.3.4.3 PT2 setting samples

CT1,CT2 set steps similar as PT2

- Modify communication parameter

Change the communication addr. from 254 to 251.Refer fig.3.4.4

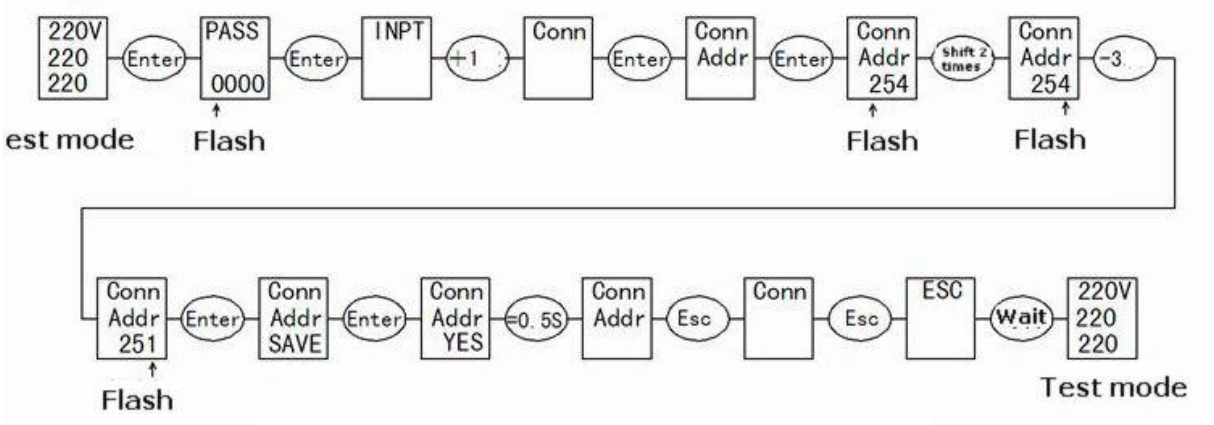


Fig.3.4.4 Communication addr. setting

- Modify connection mode

Change the connection mode from 3 Phase 4 Wire to 3 Phase 3 Wire.Refer fig.3.4.5

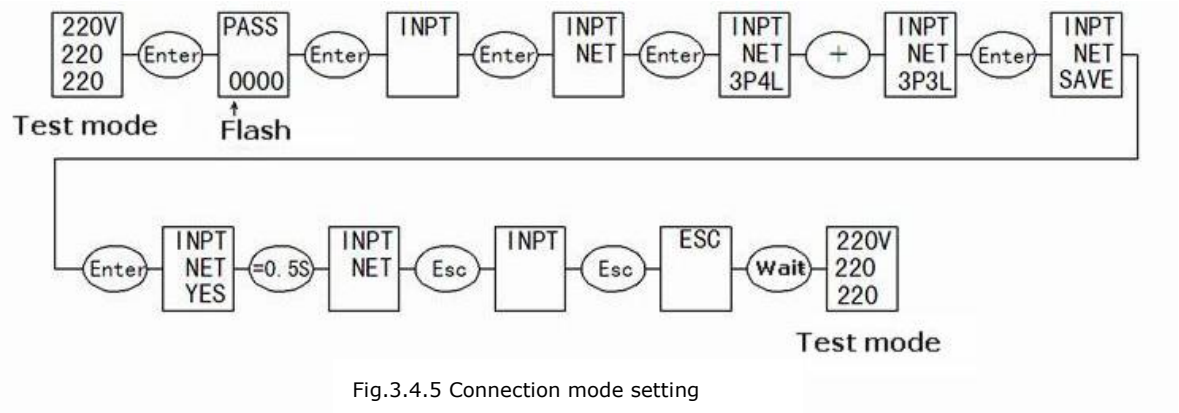
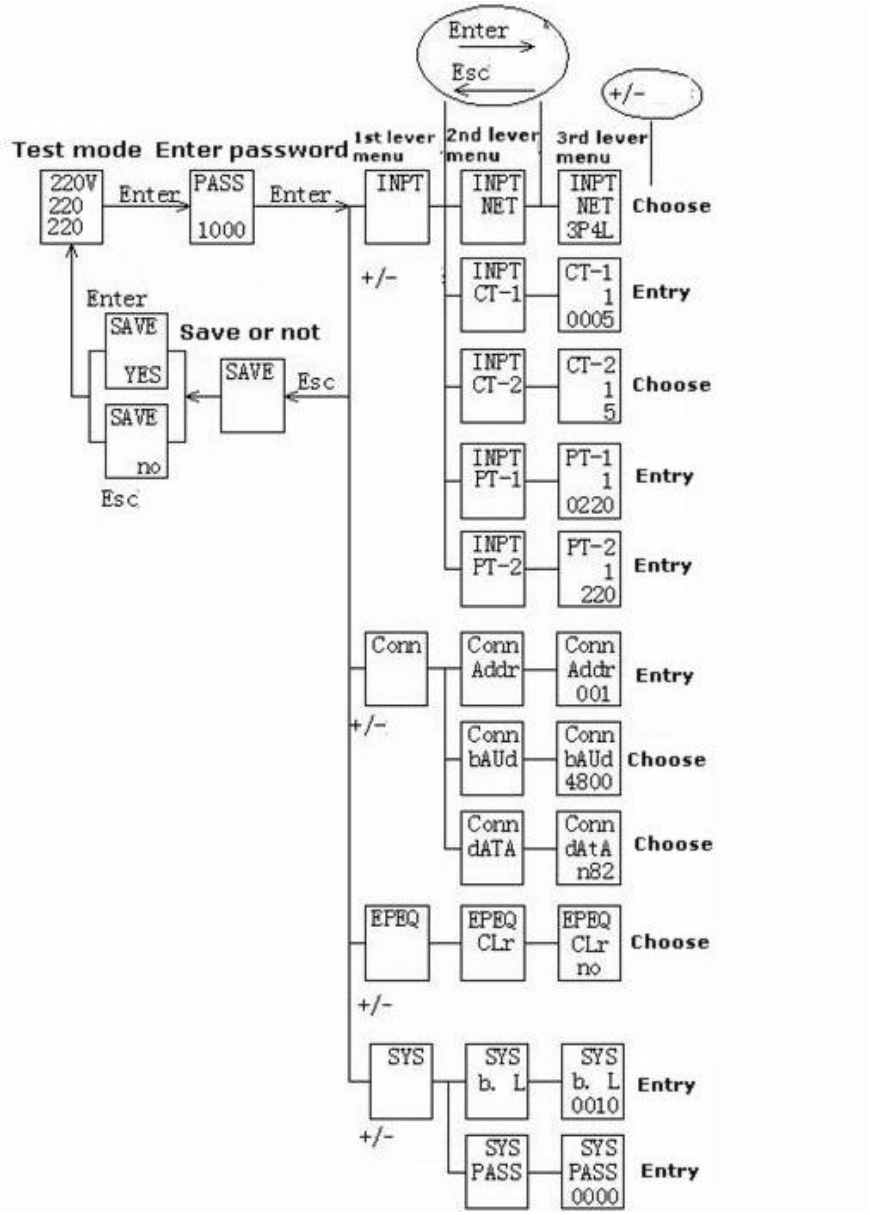


Fig.3.4.5 Connection mode setting

- File 3.4.1 Setting introduction

First lever menu	Second lever menu		Third lever menu
	Display	introduction	
INPUT Signal input	NET	Input net	Choose:3 Phase 4 Wire or 3P4L
	PT-1	Voltage primary rated value	Input:100~35KV
	PT-2	Voltage secondary rated value	Input:100~400V
	CT-1	Voltage primary rated value	Input:1~5000A
	CT-2	Voltage secondary rated value	Choose 5A/1A
CONN Communication	ADDR	Controlled computer	Input:1-254
	BAUD	Bit rate	Choose:24/48/96/192 Corresponding bit rate: 2400/4800/9600/19200bps
	DATA	Data format	Choose ✓ N82（no verify，8 digit data,2 stop bit） ✓ E81（even check,8 digit data,1stop bit） ✓ O81（Odd check,8 digit data,1 stop bit） ✓ N81（no verify8 digit data,1 stop bit）
EPEQ Electrical degree	CLR	Electrical degree reset	Choose NO/YES
SYS System	B.L	Backlight time	Input:0-30min.（0 is default）
	PASS	Password setting	Input:0000-9999（factory setting is 0000）

- Set menu structure



4.Communication

4.1 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.

4.2 Communication protocol address table and introduction

4.2.1 Communication protocol address table

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

Address	Type	Name	Register
10100	RO	DI1	1
10101	RO	DI2	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	RO	ASCII code is the hardware version no.			1
40011	RO	ASCII code is the software version no.			1
40012	RO	ASCII code is model no.			1
40013～40017	RO	ASCII code si product serial no.			5 sequential read
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 state			1
40055	WO	Subsite setting			1
40057	WO	Display interface setting	0		1
40060	RO	Electrical degree frozen and unfrozen state			1

- Basic electric parameter address table.Support function code 03,04 read

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（P）	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（Pa）	1
40142	RO	B phase active power（Pb）	1
40143	RO	C phase active power（Pc）	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*(PT1/PT2)*(CT1/CT2)，Ai is a unsigned 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:Ullage = (Uan + Ubn + Uan）/3
     3P3W:ULNAvg = 0
   - ✓ Current average vaule:
     3P4W:IAvg = (Ia+Ib+Ic)/3。
     3P3W:IAvg = (Ia+Ib+Ic)/3

- Electrical degree address table.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	Ⅰphase 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/10，Ai a unsigned long integer(0~999,999,999) which unit is kWh

Reactive energy:Ep=Ai/10，Ai a unsigned long integer(0~999,999,999) which unit is kvarh

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

- Telecommand address table.Support function code 03,04 reading

Address	Type	Data definition	Register
40520	RO	Digital input telecommand	1

***Note:**

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

Unbalance degree:Ai/10，Ai=unsigned long integer,unit is %

- Important electrical parameter quick load address table.Support 03,04 function code.Only support sequential reading.

Address	Type	Data definition	Register
42000	RO	Telecommand	1
42001	RO	Reserve (read 0)	1
42002	RO	Current Ia	2
42004	RO	Current Ib	2
42006	RO	Current Ic	2
42008	RO	Reserve (read 0)	2
42010	RO	Line voltage Uab	2

42012	RO	Line voltage Ubc	2
42014	RO	Line voltage Uca	2
42016	RO	Phase voltage Uan（valid when 3P4W ）	2
42018	RO	Phase voltage Ubn（valid when 3P4W ）	2
42020	RO	Phase voltage Ucn（valid when 3P4W ）	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 energy（Ep）	2
42034	RO	Total reactive energy（Eq）	2
42036	RO	CT	1
42037	RO	Temperature	1
42038	RO	Voltage unbalance degree PU	1
42039	RO	Current unbalance degree PI	1

***Note:**

1) 3 phase 3 wire,the data between 42014~42020 is invalid as 0
2) The correspondence of above data and actual value is as below:
   Voltage:U=(Ai/10)，Ai is a unsigned integer which unit is V
   Current:I=(Ai/1000)，Ai is a unsigned long integer which unit is A
   Frequency:F=Ai/100, Ai is a unsigned long integer which unit is Hz
   Active power:P=Ai/10 ，Ai is a signed long integer which unit is W
   Reactive power:P=Ai/10 ，Ai is a signed long integer which unit is var
   Apparent power: S=Ai/10，Ai is a unsigned long integer which unit is VA
   Power factor:PF=Ai /1000,Ai is a unsigned long integer with no unit
   Active energy:Ep=Ai/10，Ai is a unsigned long integer(0～999，999，999) which unit is kWh
   Reactive energy:Ep=Ai/10，Ai is a signed long integer(0～999，999，999) which unit is kvarh
   Temperature:T=(Ai/10)，Ai Is a signed integer which unit is ℃
   Voltage unbalance:PI= Ai/10，Ai Is a signed integer which unit is %
   Current: PI= Ai/10，Ai Is a signed integer which unit is %

- Temperature address table.Support function code 03,04 reading

Address	Type	Data definition	Register
48000	RO	Temperature	1

***Note:**

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

Temperature: T=(Ai/10) Ai is signed integer,unit is℃

4.2.2 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 address40030:value between 1~254.0 is broadcast address. 254 is factory defaults
- Communication bit rate40032:1~7 have meanings as below table

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

- Communication transfer format40034:range 0~3,this mean the verify mode

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

- Subsite state register 40050:

Address	Definition	default	Remark
Bit0	Telecommand shift mark	0	Total reset after telecommand
Bit1	Reserve	0	
Bit2	Reserve	0	
Bit3	Reserve	0	
Bit4	Reserve	0	
Bit5	Reserve	0	
Bit6	Reserve	0	
Bit7	Reserve	0	
Bit8	Reserve	0	
Bit9	Reserve	0	
Bit10	Reserve	0	
Bit11	Reserve	0	
Bit12	Reserve	0	
Bit13	Reserve	0	
Bit14	Reserve	0	
Bit15	Reserve	0	

- Subsite setting register 40055:

Address	Definition	default	Remark
Bit0	Reserve	0	
Bit1	Reserve	0	

Bit2	Reset all the electrical degree value	0	
Bit3	Reserve	0	
Bit4	Reserve	0	
Bit5	Reserve	0	
Bit6	Reserve	0	
Bit7	Reserve	0	
Bit8	Frozen all the electrical degree value	0	
Bit9	Unfrozen all the electrical degree value	0	
Bit10	Reserve	0	
Bit11	Reserve	0	
Bit12	Reserve	0	
Bit13	Reserve		0
Bit14	Reserve		0
Bit15	Forced reset		0

***Note:**

When broadcast the frozen,no need to back to the message.When the host computer issue an unfrozen order,the electrical degree value is the electrical degree accumulated value.And the inner electrical degree accumulated value keep resume.if want to refresh the reported value,the host computer must issue the unfrozen order to make it easier for customer record.The power meter will display the inner electrical degree but not the frozen 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	Ⅰphase 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	Current unbalance degree
3	Three phase phase voltage

4	Three phase line voltage
5	Voltage unbalance degree
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 state of frozen/unfrozen,other digit is available.1 is frozen,0 is unfrozen

- Telecommand 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 min. 0 is common
- 2 DI 40520: read the telecommand state,low byte 0~1 is 1~2 telecommand input.Other digit zero fill.

Byte digit	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	0	0	DI2	DI1

- 2 quick telecommand checking register,register 42000

Byte digit	7	6	5	4	3	2	1	0
42000 high byte	0	0	0	0	0	0	0	0
42000低字节	0	0	0	0	0	0	DI2	DI1