Note

Before preparing to install, operate, service or maintain, please read instruction manual carefully. Below specific messages goes through full text, or is sticked on the equipments, which reminds you to notice the potential danger or notice those statings.

Safety warning marks means it is dangerous, which will cause personal injury if you don't operate according to instructions.

⚠ Dangerous
"Dangerous" mark means an immediate danger, which will cause death immediately or grievous injury if not able to be avoid!

⚠ Warning
"Warning" mark means a potential danger, which may cause death or grievous injury if not able to be avoid!

⚠ Attention
"Attention" mark means a potential danger, which may cause smaller or medium degree of injury if not able to be avoid!

Attention
"Attention" without safety warning mark means a potential danger, which may cause property loss if not able to be avoid!

Declaration

The electrical equipments should be installed, operated, used and maintained by the qualified professionals. This manual is not aimed to be used by persons without training. For the undesirable consequence which is caused by operation without according to the manual, we will not be responsible for any responsibility

The information contained in this article is subject to changes without prior notice. All the warranty content of product and service will be specified in the attached warranty bill.

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Safety Instruction

This chapter includes the safety instructions needed to be followed before install, service and maintain the electronic equipments. Please read carefully and follow the safety instructions listed as below.

⚠ Warning
Electric shock, burning and explosion danger. Only professionals can install this equipment after reading operation instructions completely. Don't work alone. Before inspecting, testing and maintaining the equipment, please break all the power supply connection first. Before completely discharging, inspecting and hanging signs to the equipment, we should always regard the circuit as in charged state. Please pay special attention to the designs of power supply system. Consider all the power supplies, including the possibility of reverse power transmission. Cut off power supplies of all the equipments when work on the equipment or within the equipment. Please use testing equipments which can correctly adjust voltage to confirm that all the power supplies are cutted off. Be careful about the potential danger and wear the personal protection facilities. Check the working area of equipment carefully to see if there are tools and other missing objects. Please notice not to touch the charged bus when removing or install the panel, in order to avoid personal injury. The successful operation of equipment is depended on the correct handling and safe operating. Ignoring the basic install requirements may cause personal injury, also may damage electrical equipments or other objects. When conduct insulation test for the equipment installed with this meter, please cut off all the input and output wires connected to the meter. If not, the high voltage test may damage the meter. Not following this instruction may cause personal injury and death.

CONTENTS

Chapter One   General

Ⅰ Usage

　　EM300A-1AY Intelligent Network Power Meter (hereinafter referred to as this meter) is one intelligent panel meter which sets telemetering, telesignalisation into one body, and can be used widely for substation automation, distribution automation, intelligent building, and electric energy measurement, management and check of the enterprise.
This meter can measure and display all the common power parameters (such as voltage, current, active/reactive/apparent power, frequency, four quadrant power and so on), and switching value input. This meter can communicate digitally with upper computer to form intelligent distribution system together.

Ⅱ.Function Overview

　　1.　Measuring and display: This meter can measure, display, remotely transmit three phase voltage, current, voltage unbalance degree, current unbalance degree, current load rate, active/reactive/apparent power, power factor, frequency, total absolute active energy, total absolute reactive energy, input absolute active energy, output absolute active energy, input absolute reactive energy, output absolute reactive energy, four quadrant reactive energy (Note: The electric energy value can be used for inhouse second measurement management accounting and assessment, not be used for measurement payment).

　　2. Load type: Indicating the present load to be capacitive or perceptual load.

　　3.Telesignalisation function: Two switching values input(2DI), which can monitor the switch state at real time.

　　4. Communication function: RS485 interface, ModBUS-RTU protocol.

　　5. Display function: Real-time Displaying various measurement value and DI state.

　　6. Setting function: Set various meter parameters without losing when lost power

Ⅲ. Technique Data

Item			Parameter
Input / Measurement / Display	Network		Three phase three wire（3P3L）/ Three phase four wire（3P4L）are configurable.
	Voltage	Rated Value	AC400V（or AC100V）（Indicating when place order）
		Overload	Measuring: 1.2 times，Instantaneous: 2 times/10S
		Power Consumption	<1VA (per phase)
		Impedance	>400kΩ
		Accuracy	RMS metering, accuracy class is ±0.2%
	Current	Rated Value	AC5A（or AC1A）（Indicating when place order）
		Overload	Continued: 1.2 times, Instantaneous: 10 times/10S
		Power Consumption	<0.4VA (per phase)
		Impedance	<20mΩ
		Accuracy	RMS metering, accuracy class is ±0.2%
	Frequency		40~60Hz, accuracy is ±0.02Hz
	Power		Active power, reactive power, apparent power, accuracy is ±0.5%
	Electric Energy		Sum absolute active/reactive power, input absolute active/reactive energy, output absolute active/reactive energy, four quadrant reactive electricity degree. Accuracy: active electricity degree ±0.5%, reactive electricity degree ±1%
	Display		LCD display, revising the display interface by Modbus communication
Switching Value Input	Input Form		2 channels, optocoupler Isolation, passive idle contact input (2DI, optional function)
	Isolation Voltage		2500Vrms
Communication	Interface		RS485
	Communication Protocol		ModBUS-RTU
	Baud Rate		2400/4800/9600/19200bps，even check/odd check/no check are settable
Auxiliary Power Supply	Operating Range		AC:85V～265V or DC:100V～360V
	Power Consumption		≤2VA
Environment	Operating Temperature		-20℃～55℃
	Storage Temperature		-40℃～85℃
	Relative Humidity		0～95％, non-condensing
Safety	Insulation Strength		Between Input/output/casing/power supply: 2kV Acrms, 1 minute

Outline Weight	Dimension	96mm×96mm×71 mm（L×W×H）
	Weight	0.4kg

Ⅳ. Electromagnetic Compatibility

Test Item	Class	Standard
High frequency interference effect inspection	（Ⅲ，Ⅳ）class	GB/T 15153.1/1998
Electrostatic discharge disturbance effect inspection	Ⅲ class	GB/T 15153.1/1998
Electricity fast transient pulse group disturbance effect inspection	Ⅲ class	GB/T 17626.4-2008
Surge disturbance effect inspection	Ⅲ class	GB/T 15153.1/1998
Industrial frequency magnetic field disturbance effect inspection	（Ⅳ，Ⅴ）class	GB/T 17626.8-2006

Chapter Two: Installation and Wiring

Ⅰ. Installation

1. Outline and hole data:

(1). Outline dimension：96mm×96mm×71 mm

(2). Frame dimension：96mm×96mm

(3). Hole dimension：$90.5_{-0.0}^{+0.5}$ mm × $90.5_{-0.0}^{+0.5}$ mm

(4). Minimum installation depth：80mm

2. Installation Method：

Select a proper place on the power distribution cabinet to open a mounting hole with dimension 90.5 -0.0+0.5 mm × 90.5 -0.0+0.5 mm.

Take out the meter, and take off the holdfast.

Insert meter into the meter-hole of distribution cabinet, and insert the holdfast of meter.
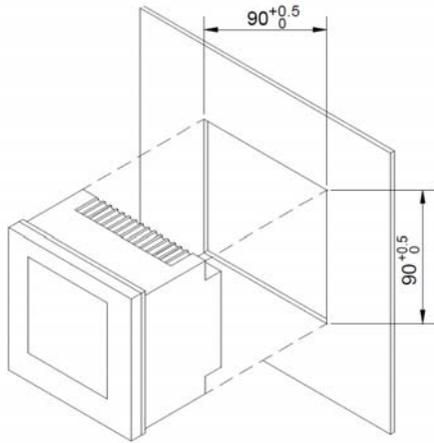
Figure 2.1.1 Mounting and hole

⚠ Attention
Suggest: Avoid to be close to the system which can produce electromagnetic interference.

Ⅱ. Terminals Instruction
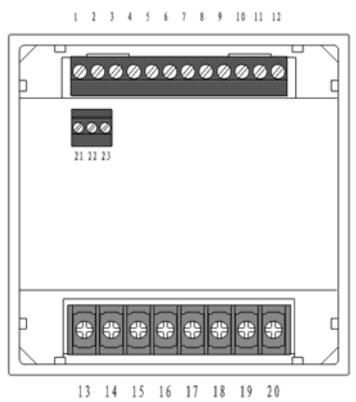
1.Terminal definition

Figure 2.2.1 Terminals definition

Chart 2.2.1 Terminals definition

Voltage input	1	U1	Current input terminals	13	I11
	2	U2		14	I12
	3	U3		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+
Telesignalisation	10	DI1		22	B-
	11	DI2		23	SHLD
	12	COM			

Ⅲ. Wiring

1. Voltage and current input wiring
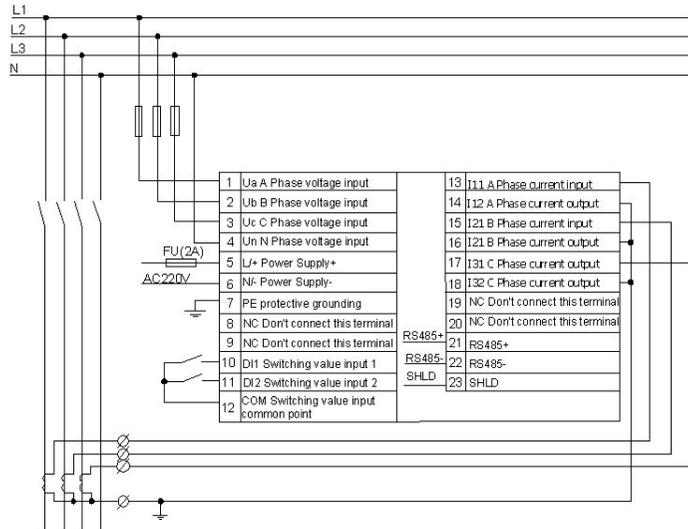
Figure 2.3.1 Three phase four wire 3PT-3CT connection mode
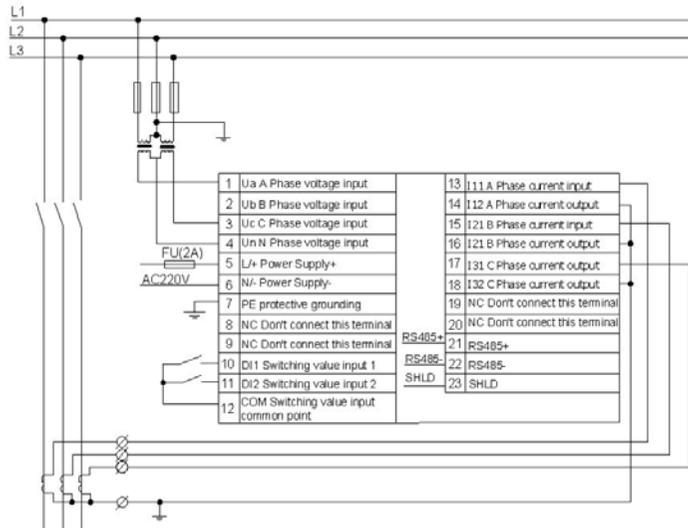
Figure 2.3.2 Three phase three wire 2PT-3CT connection mode

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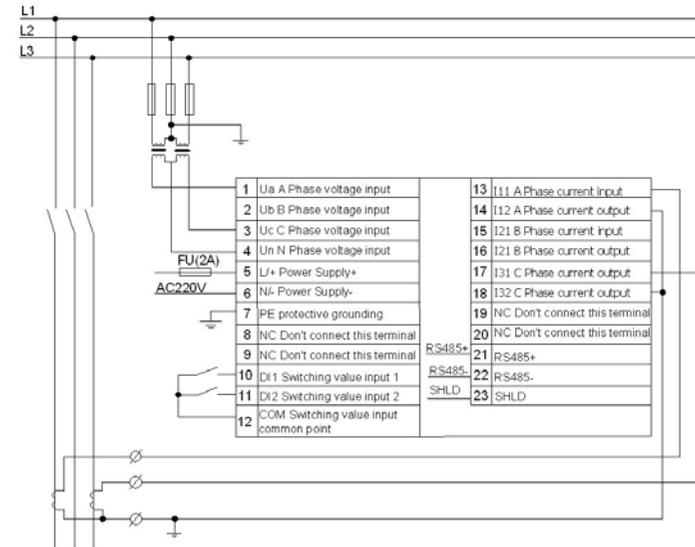
Figure 2.3.3 Three phase three wire 2PT-2CT phase voltage connection mode

Figure 2.3.1 This connection mode needs to adjust the meter to "three phase four wire" set.

Figure 2.3.2 and figure 2.3.3 connection modes need to adjust the meter to "three phase three wire" set.

⚠ Warning
1. The input voltage should not be higher than the rated voltage of meter (400V or 100V). If not, we should use PT. PT strictly prohibits short circuit, which will produce large current! We need to place 1A fuse in the voltage input end. 2. If there are other meters connected with the used CT, we need to apply serial connection mode. Before removing the current input connection of meter, we must firstly cut off the primary circuit of CT or shorted the secondary circuit of CT. The CT strictly prohibits open circuit, which will cause high voltage! We suggest to use connector bar, without connecting CT directly, which is easy to remove 3. Please make sure that the phase sequence and direction of voltage and current are corresponding.

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3. Communication wiring

The linear connection mode of communication wiring is as below figure 2.3.4, and the impedance matching resistance value is about 120Ω. The annular connection mode of communication wiring is as below figure 2.3.5.
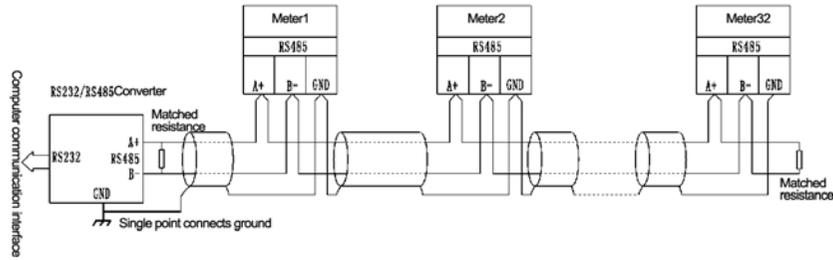

Figure 2.3.4 linear connection mode
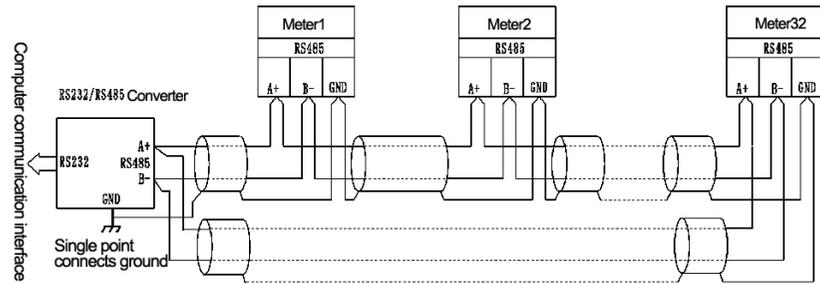
Figure 2.3.5 Annular connection mode

4. Switching value input wiring

Monitor the switching/digital value state of 2 stem node input, apply optical isolation input, the isolation voltage is 1500VAC. The isolated 24VDC outputted from the interior of equipment can offer input circuit power supply for stem node. The wiring is as figure 2.3.6.
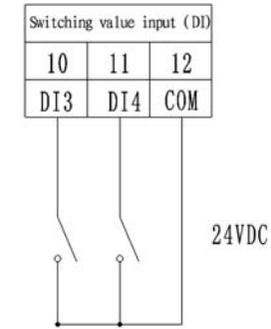
Figure 2.3.6 Switching value input wiring

Attention
1. The sectional area of the connected lead wire should meet: the sectional area of current wire is no less than 2.5mm^2, and the sectional area of voltage wire is no less than 1.0mm^2.
2. In order to decrease the impulse current during starting, we suggest that each power line connects no more than 40 sets equipments.
3. The communication wire must use shielded twisted pair wires, and the RS485+ and RS485- of communication wire should not be reversed.
4. When the communication connection applies linear connection mode, we should connect the 100~120 ohms line matching resistance separately between the starting point RS485+ and the end point RS485- of communication cable.
5.   When the baud rate is 9600bps, the cable length＜1200m.

Chapter Three: Operation Overview

Ⅰ. Panel and Display
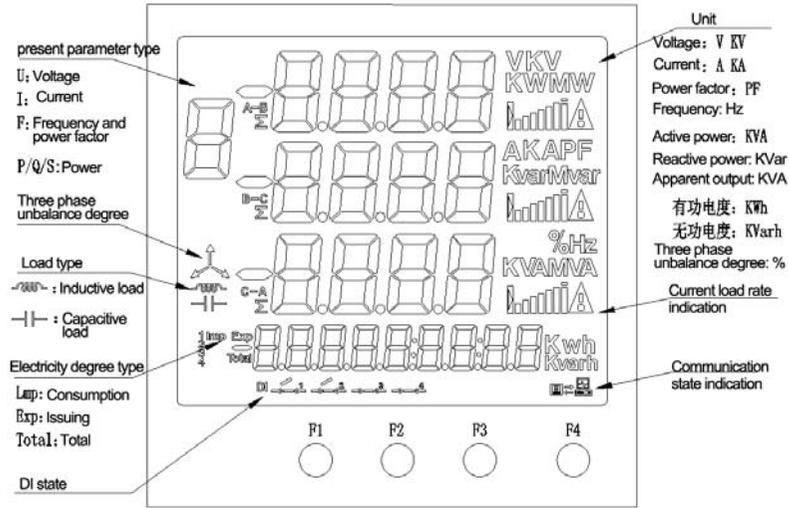
Figure 3.1.1 Meter panel and LCD display content

Ⅱ. Keying Definition

There are 4 keys in the panel: F1, F2, F3, F4. Their function is different in different operating mode of meter, and the long press and short press function is also different.

Short press：Releasing after pressing for no more than one second is short press.

Long press: Releasing after pressing for more than one second is long press.

Chart 3.2.1 Key function：

Operating mode	Action	F1	F2	F3	F4
Measuring mode	Short press	1 area switch	2 area switch	3 area switch	Electricity degree switch
	Long press	Cyclic display		Shift	
Setting mode	Short press		+	-	Shift
	Long press	Esc			Enter

Ⅲ. Measuring Mode

The charged meter will enter into measuring mode, we can check various measuring parameters by different areas in this mode.

1. 1 area display content:

1 area display content has 5 pages: current and current load rate, current unbalance degree, phase voltage, line voltage, and voltage unbalance degree. Shortly press F1 to check the content of each page (In three phase three wire mode, it is impossible to display the phase voltage page, and the Uca of line voltage isn't displayed).
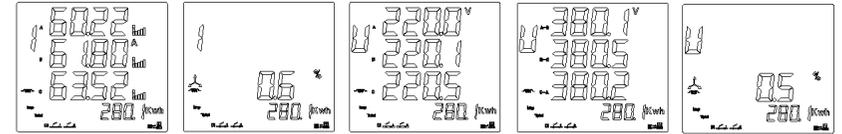
Figure 3.3.1   1 area display content diagram

Load rate indication: The percent between the secondary current and rated current is 0%~120%. In individual phase current display, the meter will display the load rate of each phase simultaneously. The meaning of load rate display is as figure 3.3.2.
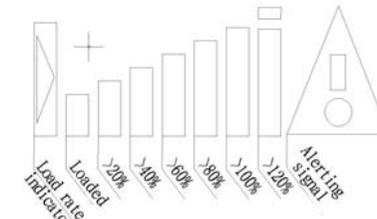
Figure 3.3.2   Load rate display

2. 2 area display content：

2 area display content has 2 pages: conjunction power factor and frequency, and phase-splitting power factor. Shortly press F2 to check the content of each page (In three phase three wire mode, it is impossible to display phase-splitting power factor page) as figure 3.3.3.
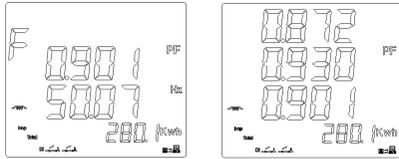
Figure 3.3.3　2 area display content diagram

3．3 area display content:

3 area display content has 4 pages, phase-splitting active power, phase-splitting reactive power, phase-splitting apparent power, and total power(PQS). Shortly press F3 to check the content of each page (In three phase three wire mode, it can only display conjunction total power PQS page) as figure 3.3.4.
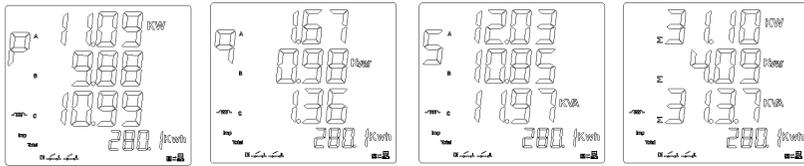

Figure 3.3.4　3 area display content diagram

4．Electricity degree display:

Shortly press F4 can check positive total active energy, negative total active energy, positive total reactive energy, negative total reactive energy, four quadrant reactive energy, as figure 3.3.5.

Electricity degrees freeze doesn't influence display data, the display data herein is updated at real time. After the electricity degree is freezed, the electricity degree data read by Modbus is not updated. When the electricity degree is unfreezed, the read electricity degree data is real-time data.

Total absolute active energy	280.2 Kwh
Total absolute reactive energy	57.2 Kwh
Positive total active energy	280 Kwh
Negative total active energy	0 Kwh
Positive total reactive energy	50.2 Kwh
Negative total reactive energy	7.0 Kwh
The first quadrant reactive energy	30.7 Kwh
The second quadrant reactive energy	19.5 Kwh
The third quadrant reactive energy	3.2 Kwh
The fourth quadrant reactive energy	3.8 Kwh

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Figure 3.3.5　4 area display content diagram

5．Communication marks instruction

When the meter receives the data transmitted from master station, it will display mark as figure 3.3.6.
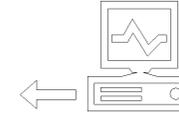
Figure 3.3.6 receiving data mark

When the meter sends date to master station, it will display mark as figure 3.3.7.
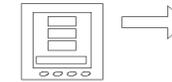
Figure 3.3.7 sending data mark

6、Switching value display

The switching value state can be displayed in the LCD as figure 3.3.8: DI1 open, DI2 open, DI3 and DI4 are not used.
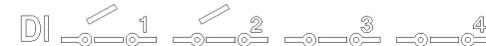
Figure 3.3.8 Switching value state display

Ⅳ. Setting Mode

Long press F4 in measuring mold, then enter into setting mode, which require to input password first, the default password is "0000". After successfully entering, shortly press F2(+ function) or F3(- function) to select the items needed to set. Long press F4(validation function) to enter into the submenu. In the third menu, please select the specific item, or input the specific value. Long press F4(validation function) to confirm the selection, long press F1(exit function) to give up the selection, which will return to the previous menu automatically.

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In the third menu which requires to input the specific value, please shortly press F4(shift function) to select the position needed to revise. After this position is twinkling, shortly press F2(+ function) or F3(- function) to revise the value, then long press F4(validation function) to confirm, or long press F1(exit function) to give up. If the input value is not within the prescribed limit of meter, the meter will display "ERRn" error message after confirming, which requires to re-input.

Long press F1(exit function) in the first menu, which will require to confirm preserving or not. Long press F4(validation function) to preserve, or long press F1(exit function) to give up preserving, which means the selected and inputted values will be lost, then return to measuring mode automatically. The setting value of meter will not lost during power down.

1、Setting example

CT1、CT2、PT1、PT2 settings have coefficient setting.

The rated value of primary/secondary= set value × coefficient.

Set the primary rated voltage PT1 to 35KV as figure 3.4.1: Please revise the set value to 3500 and set the coefficient to 10 according to formula.
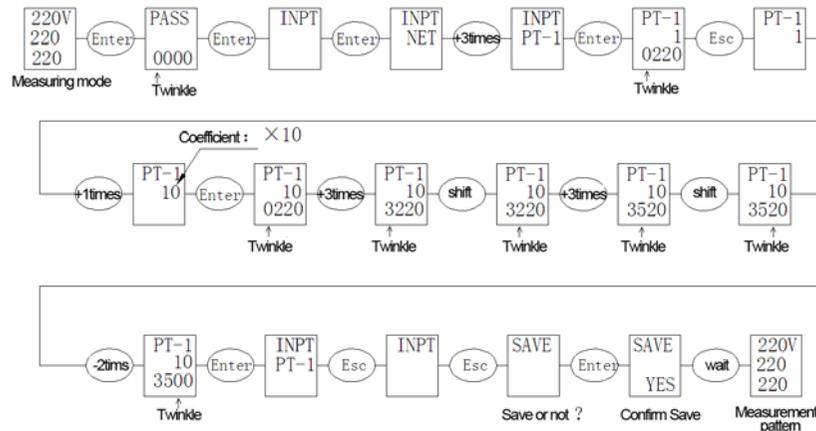
Figure 3.4.1   PT1 setting operation example

Set the secondary rated voltage PT2 to 100V as figure 3.4.2. Please revise the set value to 100 and set the coefficient to 1 according to formula.
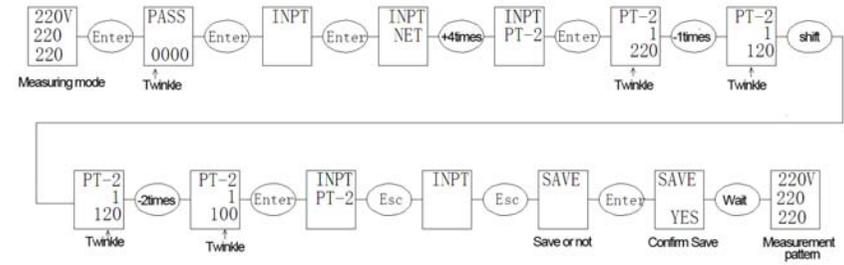
Figure 3.4.2   PT2 setting operation example

Below is the operation for revising the original correspondence address 254 to 251:
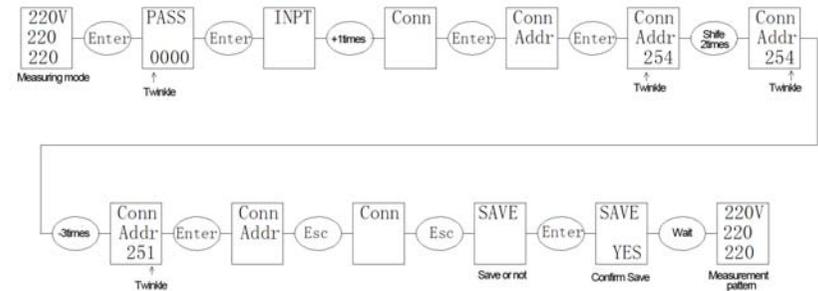
Figure 3.4.3 Communication address setting

Below is the operation for revising the connection mode from three phase four wire to three phase three wire.
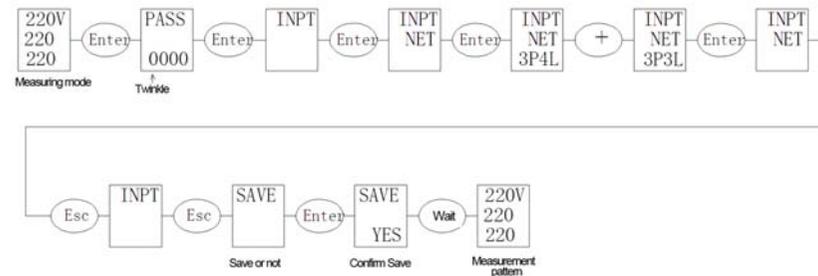
Figure 3.4.4 Connection mode setting

Chart 3.4.1 Setting item instruction:

First menu	Second menu		Third menu
	Display	instruction	

INPUT	NET	Input network	Select： 3P4L Three phase four wire/ 3P3L Three phase three wire
	PT-1	Primary voltage rated value	Input：100~35KV
	PT-2	Secondary voltage rated value	Input：100~400V
	CT-1	Primary current rated value	Input：1~5000A
	CT-2	Secondary current rated value	Select 5A/1A
CONN (Communication)	ADDR	Slave address	Input：1-254
	BAUD	Baud rate	select：24/48/96/192 corresponding baud rate： 2400/4800/9600/19200bps
	DATA	Data format	Select： N82（No check, 8 data bits, 2 stop bits） E81（Even check, 8 data bits, 1 stop bit） O81（Odd check, 8 data bits, 1 stop bit） N81（No check, 8 data bits, 1 stop bit）
EPEQ (Electricity degrees)	CLR	Electricity degree reset	Select：NO/YES
SYS (Systerm)	B.L	Backlight time	Input：0-30（0 means constant lighting）
	PASS	Password setting	Input：0000-9999（Factory setting is 0000）

Structure of setting menu:

Note：“Esc”= long press F1；“+”= shortly press F2；“-”= shortly press F3；
Enter = long press F4。

Figure 3.4.5 structure chart of setting menu

Chapter Four: Communication

Ⅰ. MODBUS Protocol Overview

MODBUS-RTU protocol overview is a very usual protocol overview, it is master-slave response connections (half-duplex). The master station (like PC) sends signal to find a terminal equipment, then this terminal equipment sends a response signal to master station.

Ⅱ. Communication Protocol Address List and Instructions

1. Communication Protocol Address List

● Digital value address list, support function code 02 reading.

Address	Type	Name	Register
10100	RO	DI1	1
10101	RO	DI2	1

● System information address list, support function code 03, 04 reading and function code 06, 10 setting.

Address	Type	Name	Value range	Remark	Register
40010	RO	ASCII code means hardware version number			1
40011	RO	ASCII code means software version number			1
40012	RO	ASCII code means product model			1
40013 ～ 40017	RO	ASCII code means product serial number			5 continuous
40025	RW	password	0000~9999	**Default：0000**	1
40030	RW	Communication address	1～254	**Default：254**	1
40032	RW	communication baud rate	1～7	**Default：5**	1

40034	RW	communication verification mode	0～3	Default：0	1
40050	RO	substation state			1
40055	WO	Substation setting			1
40057	WO	The meter display page setting	0		1
40060	RO	The freezing and unfreezing state of electricity degree			1

● System parameter address list, support function code 03, 04 reading and function code 06, 10 setting.

Address	Type	Name	Value range	Remark	Register
40071	RW	Telemetering connection mode	1/3	default：1	1
40073	RW	PT primary voltage rated value	100~35K	default 220/220	2(continuous writing)
40074	RW	PT secondary voltage rated value	100 ～ 400V		
40076	RW	bit14-bit0 means CT primary current rated value bit15=0/1 means secondary is 5A/1A	Primary current rated value：1～5000A	default：0x5 （5：5）	1
40096	RW	the lightening time of backlight	0~30 minutes	default：5	1

● Basic electrical parameters address list, 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	Line voltage average value ULLAvg	1
40124	RO	Phase voltage Uan	1
40125	RO	Phase voltage Ubn	1
40126	RO	Phase voltage Ucn	1
40127	RO	Phase voltage average value ULNAvg	1

40128	RO	current Ia	1
40129	RO	current Ib	1
40130	RO	current Ic	1
40131	RO	three phase current average value IAvg	1
40132	RO	Reserve read value is 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: In three phase three wire mode, the data in address 40122、40124～40127、40138～40149 is invalid, all are 0.

Note 2: The correspondence between the above data (Ai) and the actual value is as below:

Voltage：U=(Ai/100)*(PT1/PT2)，Ai is the unsigned integer, unit is V. Current：I=(Ai/1000) *(CT1/CT2)，Ai is the unsigned integer, unit is A.

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

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

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

Power factor：PF=Ai /1000,Ai is the unsigned integer, no unit.

Frequency：F=Ai/100, Ai is the unsigned integer, unit is Hz.

Note 3: The computing method of average value:

Line voltage average value：

Three phase four wire mode：ULLAvg = (Uab + Ubc + Uac）/3。

Three phase three wire mode：ULLAvg = (Uab + Ubc）/2

Phase voltage average value：

Three phase four wire mode：ULNAvg = (Uan + Ubn + Ucn）/3。

Three phase three wire mode：ULNAvg = 0;

Three phase current average value：

Three phase four wire mode：IAvg = (Ia+Ib+Ic)/3。

Three phase three wire mode：IAvg = (Ia+Ib+Ic)/3

● Electricity degree value address value, support function code 03, 04 reading and function code 10 setting

Address	Type	Data definition	Register
40200	RW	Total active absolute electricity degree integrated value	2
40202	RW	Total reactive absolute electricity degree integrated value	2
40216	RO	Total positive active absolute electricity degree integrated value	2
40226	RO	Total negative active absolute electricity degree integrated value	2
40236	RO	Total positive reactive absolute electricity degree integrated value	2
40246	RO	Total negative reactive absolute electricity degree integrated value	2
40256	RO	Ⅰ phase sum reactive absolute electricity degree integrated value	2
40266	RO	IV phase sum reactive absolute electricity degree integrated value	2
40276	RO	II phase sum reactive absolute electricity degree integrated value	2
40286	RO	III phase sum reactive absolute electricity degree integrated value	2

Note 1: The correspondence between the above data (Ai) and the actual value is as below:

Active electricity degree：Ep=Ai/10, Ai is unsigned long integer (0～999，999，999), unit is kWh.

Reactive electricity degree：Eq＝Ai/10, Ai is unsigned long integer (0～999，999，999), unit is kvarh.

Note 2: When set the meter bottom, there is no influence to freeze the electricity degree data.

● Telesignalisation value address list, support function code 03, 04 reading

Address	Type	Data definition	Register
40520	RO	Switching value input telesignalisation	1

● Electric energy quality address list, support function code 03, 04 reading

Address	Type	Data definition	Register
40760	RO	Voltage unbalance degree	1
40761	RO	Current unbalance degree	1

Note: The correspondence between the above data (Ai) and the actual value is as below:

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

● Important electrical parameter quick reading address list, support 03, 04 function code(only support continuous reading)

Address	Type	Data definition	Register
42000	RO	Telesignalisation	1
42001	RO	Reserve(reading is 0)	1
42002	RO	Current Ia	2
42004	RO	Current Ib	2
42006	RO	Current Ic	2
42008	RO	Reserve(reading is 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 in three phase three wire mode）	2
42018	RO	Phase voltage Ubn（Valid in three phase four wire mode）	2
42020	RO	Phase voltage Ucn（Valid in three phase four wire mode）	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 quantity（Ep）	2
42034	RO	Total reactive electric quantity（Eq）	2
42036	RO	CT	1

42037	RO	Temperature	1
42038	RO	Voltage unbalance PU	1
42039	RO	Current unbalance PI	1

Note 1: In three phase three wire mode, the data of address 42014～42020 is invalid, all are 0.

Note 2: The correspondence between the above data (Ai) and the actual value is as below:

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

Current：I=(Ai/1000), Ai is unsigned long integer, unit is A.

Frequency：F=Ai/100, Ai is unsigned long integer, unit is Hz.

Active power：P=Ai/10, Ai is signed long integer, unit is W.

Reactive power：Q=Ai/10, Ai is signed long integer, unit is var.

Apparent power：S=Ai/10, Ai is unsigned long integer, unit is VA.

Power factor：PF=Ai /1000, Ai is unsigned long integer, no unit.

Active electricity degree：Ep=Ai/10, Ai is unsigned long integer(0～999，999，999), unit is kWh.

Reactive electricity degree：Eq＝Ai/10, Ai is unsigned long integer(0～999，999，999), unit is kvarh.

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

Voltage unbalance：PU= Ai/10, Ai is unsigned integer, unit is %.

Current unbalance：PI= Ai/10，Ai is unsigned integer, unit is %.

● Temperature address list: support function code 03, 04 reading

Address	Type	Name	Register
48000	RO	Temperature	1

Note: The correspondence between the above data (Ai) and the actual value is as below:

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

2. Register address instruction

● Hardware version number register (40010): Reserved in program storage.

● Software version number register (40011): Reserved in program storage.

● Product model code (40012): Reserved in program storage.

● Product producing serial number(40013～40017): Specially download in E2PROM after production inspection.

- Communication address(40030): Value is 1～254, the additional 0 is reserved for broadcast address: 254 is used for factory default address.

- Communication baud rate(40032)：1～7 represent different baud rate as below chart:

Communication baud rate code	Explanation
1	Reserve(not settable)
2	Reserve(not settable)
3	2400 bps
4	4800 bps
5	9600 bps
6	19200 bps
7	Reserve(not settable)

- Communication transmitting format(40034): Range 0~3 means verification mode as below chart:

Verification mode code	Explanation
0	Without odd even check, 2 stop bits
1	Even check, 1 stop bit
2	Odd check, 1 stop bit
3	Without odd even check, 1 stop bit

- Substation state register(40050):

Addressing	Definition	Default value	Remark
Bit0	Telesignalisation displacements mark	0	Reset after telesignalisation checking
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	

- Substation setting register(40055):

Addressing	Definition	Default value	Remark
Bit0	Reserve	0	
Bit1	Reserve	0	
Bit2	clear all electricity degree	0	
Bit3	Reserve	0	
Bit4	Reserve	0	
Bit5	Reserve	0	
Bit6	Reserve	0	
Bit7	Reserve	0	
Bit8	Freeze all electricity degrees	0	
Bit9	Unfreeze all electricity degrees	0	
Bit10	Reserve	0	
Bit11	Reserve	0	
Bit12	Reserve	0	
Bit13	Reserve		0
Bit14	Reserve		0
Bit15	Forced reset		0

Note: When freeze and unfreeze broadcast, there is no need to return message. When the upper computer sends freeze order, all the read electricity degrees are the integrated value of electricity degrees at freeze time, while the interior electricity degree integration is still conducted. If you want to update the reported electricity degree integrated value, the upper computer must send unfreezing order, to make unified meter reading easier for users. The meter displays interior electricity degree, not freezing electrictity degree.

- Meter display page setting 40057

  40057 high byte: electricity degree display page setting:

Code	Explanation
0	No operation
1	Total active absolute electricity degree integrated value
2	Total reactive absolute electricity degree integrated value
3	Total positive active absolute electricity degree integrated value
4	Total negative active absolute electricity degree integrated value
5	Total positive reactive absolute electricity degree integrated value
6	Total negative reactive absolute electricity degree integrated value
7	Ⅰ phase sum reactive absolute electricity degree integrated value
8	II phase sum reactive absolute electricity degree integrated value
9	III phase sum reactive absolute electricity degree integrated value
10	IV phase sum reactive absolute electricity degree integrated value

40057 low byte: basic display page setting:

Code	Explanation
0	No operation
1	Three phase current
2	Current unbalance degree
3	Three 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

● Electricity degree freezing and unfreezing state register(40060)

BIT0 means the freezing and unfreezing state of electricity degree, the other bits are invalid. 1 means freezing, 0 means unfreezing.

● Telemetering wiring mode(40071): 1~5 means the specific wiring modes as below

chart:

Wiring mode code	Explanation
1	Three phase four wire mode 3CT(3P4W/3PT+3CT)
2	Reserve(not settable)
3	Three phase three wire mode 3CT(3P3W/3PT+3CT)
4	Reserve
5	Reserve(not settable)

● Backlight lightening time(40090): 0～30 minutes, and the 0 means constant lighting.

● 2 channels digital value input(40520): Reading telesignalisation state, low byte 0~1

in turn is the 1~2 telesignalisation input, the other bytes are zero fill.

The bit in bytes	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

● Quick telesignalisation checking register——Register 42000

The bit in bytes	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	0	0	DI2	DI1

Chapter Five: Maintainance and Warranty

When the meter has below problems, the users can try to solve by themselves.

Measuring data is disordered: Try to cut off the power then put on the power again.

Communication error: Check the slave address is repeated or not, the communication parameter setting is correct or not, if there is something wrong with the communication cable connection, if the external interference is too big, etc..

If the communication error is still existing when the communication parameter is correct and it is impossible to distinguish the meter problem and upper computer or cable problem, you can connect the nearby single meter with the computer by shorter cable, and run configuration software to test the communication. If the communication is normal, that means the there is a problem with upper computer or cable.

If there are other problems rising, please don't try to maintain by yourself, in order to avoid extended fault, please contact our company freely.

For the warranty terms of product, please check the accompanied warranty list.

(Instruction manual version：V1.0)

Appendix:

Ⅰ Parameter factory default value

No.	Parameter description	Default value	Remarks
1	Communication parameter	254,9600，n81	Address: 254; Baut rate: 9600pbs; Transmitting format: 1 start bit, 8 digital bits, no odd even checking, 1 stop bit
2	Wiring mode	Three phase four wire	Optional: 3P4L/3P3L
3	Primary voltage rated value PT-1	220V	Range: 100V-35KV
4	Secondary voltage rated value PT-1	220V	Range: 100V-400V
5	Primary current rated value CT-1	5A	Range: 1-5000A
6	Secondary current rated value CT-2	5A	Optional: 1A/5A
7	Electricity degree freezing	Unfreezing	
8	Backlight duration	5 minutes	Range: 0-30 min（0 is constant lighting）
9	Password	0000	Range: 0000-9999