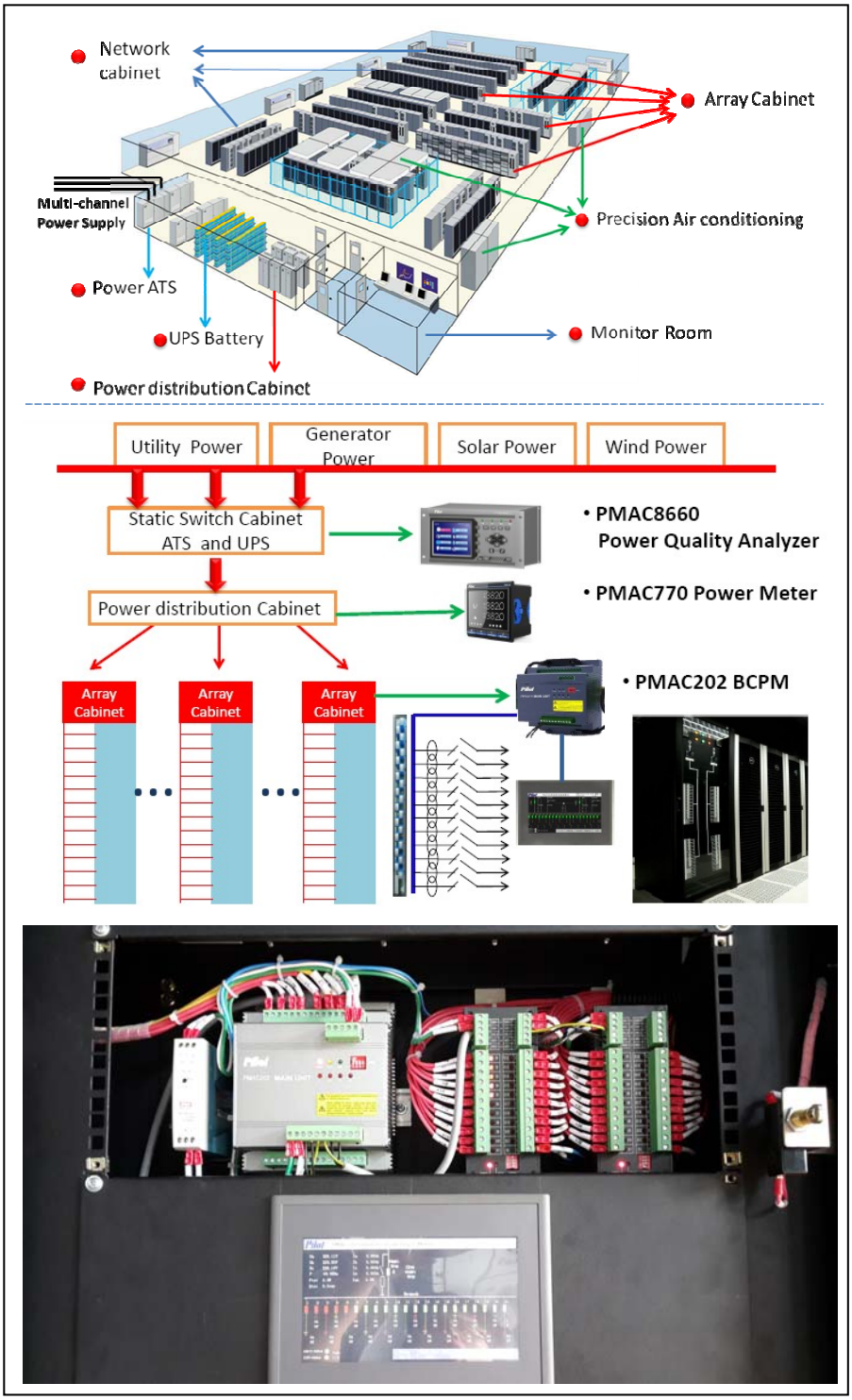
# PMAC202 Branch Circuit Power Meter

# User Manual

**V1.0**

Installation & Operation Manual




## ⚠ Danger and Warning!

This device can be installed only by professionals.

The manufacturer shall not be responsible for any accident caused by failure to comply with the instructions in this manual.

## ⚠ Risks of Electric shocks, buring or explosion

- This device can be installed and maintained only by qualified people.
- Before operating the device, isolate the voltage input, power supply and short-circuit the secondary windings of all current transformers.
- Put all mechanical parts, doors, or covers in their original positions before energizing the device.
- Always supply the device with the correct working voltage during its operation.

*Failure to take these preventive measures would cause damage to the equipment or injuries to people*

# Contents

# 1. Product Introduction

## 1.1 Overview

PMAC202 Branch Circuit Power Meter is specially designed for monitoring Power supply distribution cabinet in data center, which can monitor incoming circuit and outgoing circuit parameters, DI/DO status, fulfill monitoring for power supply distribution cabinet and alarming for abnormal voltage and current information. 7 inch HMI with system chart display which can best fulfill visuality and operability, customer can choose 21$^{st}$ – 168st (Unit: 21$^{st}$) outgoing circuit by load quantity. This PMAC202 also provide extra communication port which can easily connect with other systems.

## 1.2 Product Features:

1. Metal case, efficiently electromagnetic interference shield
2. Module design, separate Main-body module, CT module, Digital Input module, can fulfill different technical requirement
3. 7 Inch HMI human-computer interface, good visuality and operability
4. No extra secondary contact, each DI/DO switch has separate status indicate light
5. Can measuring incoming circuit Null Line current
6. Can measuring incoming circuit Leakage current
7. Can measuring Null earth voltage
8. Can measuring outside temperature
9. Relay alarm function, can record more than 2000 pieces alarming information
10. Measuring the KWH on 2 loop incoming and each outgoing circuit, fulfill energy management requirement
11. Measuring harmonic of voltage and current, monitoring power supply quality
12. Current Transformer accuracy is 0.2%, make sure the measuring accuracy
13. Modbus-RTU protocol, Rs485 communication

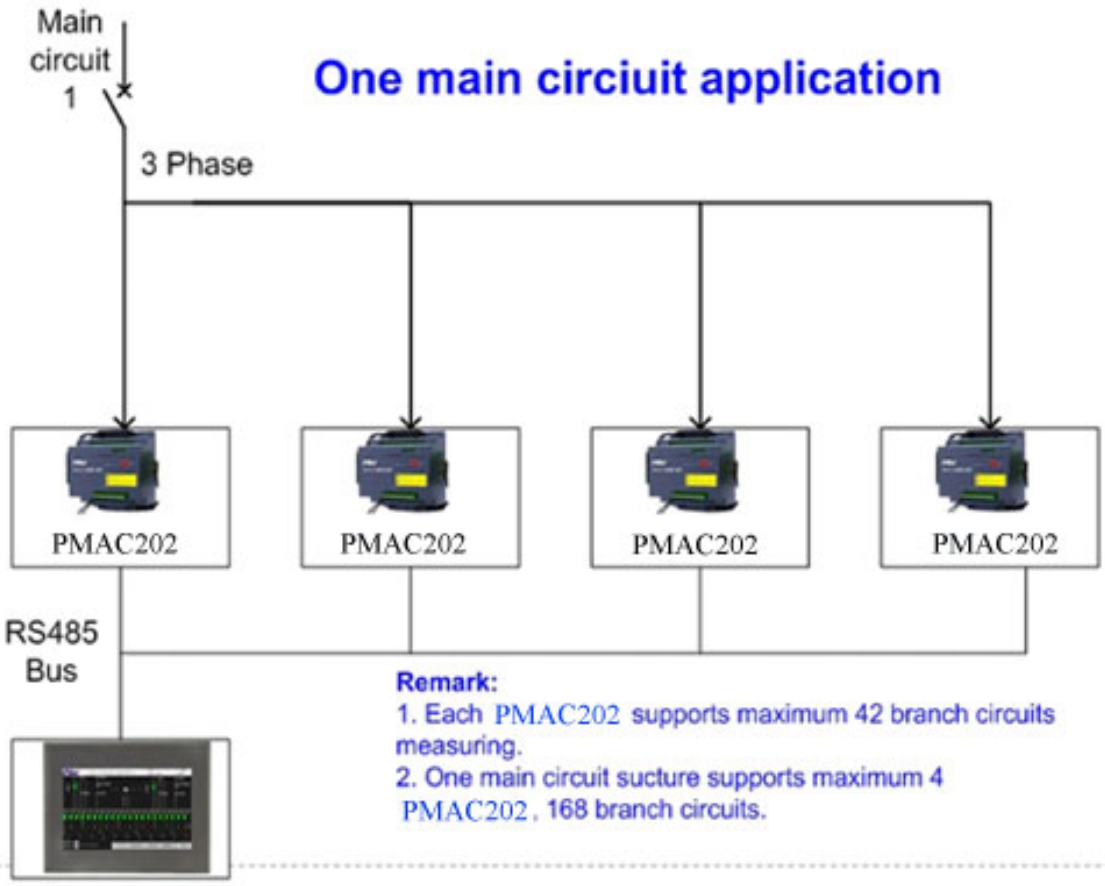
## 1.3 HMI Human-Computer Interface

PMAC202 branch circuit power meter with 7 inch touch screen human-computer interface, system chart display, with best visuality and operability.

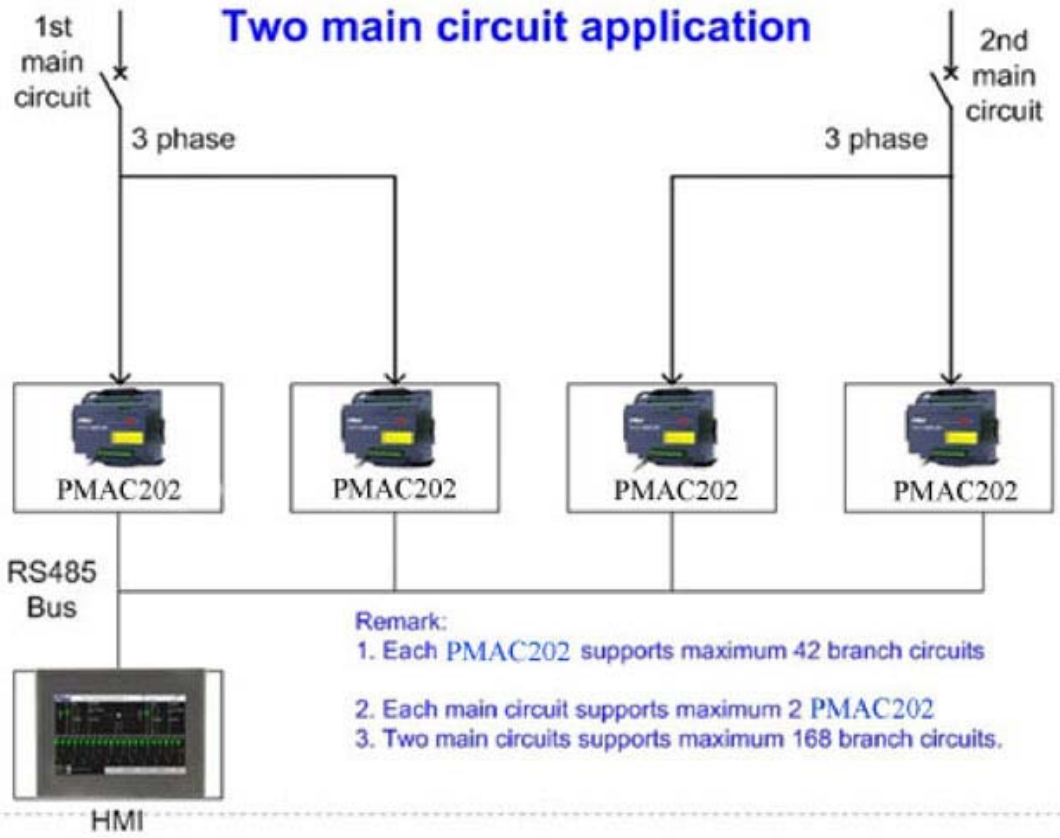
## 1.4 Product Composition

PMAC202 Branch Circuit Power Meter with module design which including Main-body module, Digital Input module, HMI module, CT module. According to different application to choose different configuration, following are two main typical application for reference:

- One Way Incoming Line：



- Two Way Incoming Line：



# 2. Product Performance and functionality

## 2.1 Product Model

| | | |
|---|---|---|
| **Name** | PMAC202 Branch Circuit Power Meter | |
| **Model** | PMAC202-□-□-□-□-□<br>① ② ③④ ⑤ | |
| | ①Alternative<br>A or B | **A- Basic Model**<br>Main Circuit measuring: 3 phase voltage, current, current unbalance, current demand per phase, maxim current demand, maxim current, active power (total/each phase), reactive power (total/each phase), power factor, frequency, active energy, reactive energy, voltage THD, current THD, neutral current, 4 status input, 2 relay output<br>Branch Circuit measuring: current, active power, reactive power, power factor, active energy, reactive energy, current demand, maxim current demand, maxim current, current THD |
| | | **B- Advanced Type**<br>On the base of A Basic model, expanded status input for each branch circuit |
| | ②Alternative<br>21 or 42 | **21- Monitoring 21 branch circuits**<br>**A Type**: One 21 loop CT module<br>**B Type**: One loop CT module + One 21 loop Status module **(Advanced Type)** |
| | | **42- Monitoring 42 branch circuits**<br>**A Type**: Two 21 loop CT module<br>**B Type**: Two loop CT module + Two 21 loop Status module **(Advanced Type)** |
| | ③Alternative<br>M or S | **M1**- Branch Circuit 21 loop CT strip, Rated Current: 50A<br>**S1**- Branch Circuit separate CT, Rated Current 50A<br>**S2**- Branch Circuit separate CT, Rated Current 100A<br>**S3**- Branch Circuit separate CT, Rated Current 200A |
| | ④Alternative<br>T、L、TL | **T**- One loop temperature measuring, PT100 device<br>**L**- One leakage current measuring, rated current 1A (primiary)<br>**TL**- One loop temperature and One leakage current measuring |
| | ⑤Alternative<br>W or Y | **W**- Branch Circuit External Status input Dry connection<br>**Y**- Branch Circuit External Status input Wet connection |

## 2.2 Product Function

| Function | Illustration |
|---|---|
| **Incoming Line** | |
| Null Line Current monitoring | Monitoring Null Line current of incoming line |
| Leakage Current monitoring | Incoming Line leakage current monitoring, Rated value is 1A (primary) |
| Temperature monitoring | One loop temperature monitoring, range: 0—120 degree. Measuring Isolation Transformer temperature |
| Incoming line Switch status monitoring | 4 loop status used to measuring incoming line switch and lighting protection switch. External Wet connection |
| Incoming line electrical parameter measuring | including phase voltage, phase current, phase maxim current, current unbalance, each phase active power, total active power, total power factor, frequency, total KWH |
| Incoming line demand measuring | Each phase current demand, maxim current demand, each phase active power demand, each phase maxim active power demand, total active power demand, maxim total active power demand |
| Incoming Line Harmonic measuring | Phase voltage, current total harmonic distortion (2-31$^{st}$ harmonic) of incoming line |
| Incoming overload alarm | Over than setting current value will alarm, it is UP limit alarm and Over UP limit alarm |
| Incoming underload alarm | Less than setting current value will alarm, it is Lower limit alarm and Over Lower limit alarm |
| Incoming line Current Unbalance alarm | Over than setting unbalance value will alarm, one setting value |
| Incoming line Over Voltage alarm | Over than setting voltage value will alarm, one setting value |
| Incoming line Under Voltage alarm | Less than setting voltage value will alarm, one setting value |
| Null Line Over Current alarm | Over than setting current value will alarm, one setting value |
| Incoming Line Voltage default phase Alarm | If there is any phase measuring voltage is 0, and exist another phase voltage higher than 20V at the same time, the Default phase alarm will work. There is no setting value for default phase alarm |
| Leakage current over current alarm | Over than setting current value will alarm, one setting value |
| Temperature alarm | Over than setting temperature value will alarm, one setting value |
| **Outgoing Line** | |
| Multi-channel outgoing line monitoring | Can provide 21$^{st}$, 42$^{nd}$ loop outgoing line circuit for choosing |
| Outgoing Line Switch status monitoring | Monitoring multi-channel Switch ON/OFF status, No auxiliary contact is also OK |
| Outgoing Line electrical parameters measuring | Current, Maxim Current, Active Power, Reactive Power, Power Factor, KWH, Current THD |
| Outgoing Line Demand measuring | Current demand, Maxim current demand, Active Power demand, Maxim Active Power demand |
| Outgoing Line Overload Alarming | Over than setting current value will alarm, it is UP limit alarm and Over UP limit alarm |
| Outgoing Line Underload alarming | Less than setting current value will alarm, it is Lower limit alarm and Over Lower limit alarm |

| | |
|---|---|
| Switch status change alarm | Alarm for switch change from OFF to ON, can close by software |
| **Others** | |
| HMI | 7 Inch touch screen, resolution 800x480 |
| Communication Port | RS485 Modbus-RTU Protocol |
| Relay Output | 2 relay as alarm port |
| Event record function | HMI can record more than 2000 pieces alarming events |
| Setting Function | Setting parameters by HMI, such as: CT Ratio, Alarm value |
| Running Indication | Main module and Digital Input module with running indicate light |
| Switch Status Indication | Switching value indicating light |
| Outgoing phase sequence configurable | Outgoing phase sequence can be configured by HIM or Communication |
| kWh Pulse output | Active Power pulse output can be configured as Incoming line or Outgoing line |
| Data Record | Record History KWH and Current for Year, Month of Incoming line and Outgoing line |

## 2.3 Technical Specification

| Name | Illustration |
|---|---|
| Power Supply | DC 24V，Range: 18～30V。 |
| Mean free error time | No less than 50000 hours |
| Life time | 10 Year |
| Rated Voltage | AC 220V phase voltage，Range: 10%～120% Rated Value；<br>Accuracy: 0.5% |
| Rated Incoming line Current | 5Aac，Range: 1%～120% Rated Value；Accuracy: 0.5% |
| Rated Outgoing Current | 50Aac，1%～120% Rated Value；Accuracy: 0.5% |
| Demand Measuring | Demand period 15 minutes, slip frequency time 1 minute |
| Rated Frequency | 50Hz，Range: 45～60Hz，±0.01Hz |
| Power Factor | Incoming circuit accuracy: 1%，Outgoing Circuit accuracy: 1% |
| Active Power and KWH | Incoming circuit accuracy: 1%，Outgoing Circuit accuracy: 1% |
| Leakage Current | 1A ac, Range: 10%--120% rated, accuracy: 0.5% |
| Null-Earth Voltage | 5V ac, Range: 10%--200% rated, accuracy: 0.5% |
| Communication port | RS485 |
| Switch Status | Outgoing: Wet contact signal input,  220Vac, 70%--120% rated value or Dry contact input<br>Incoming: Dry contact input |
| Relay Capacity | AC 250V/5A or DC 30V/5A |

## 2.4 EMC Properties

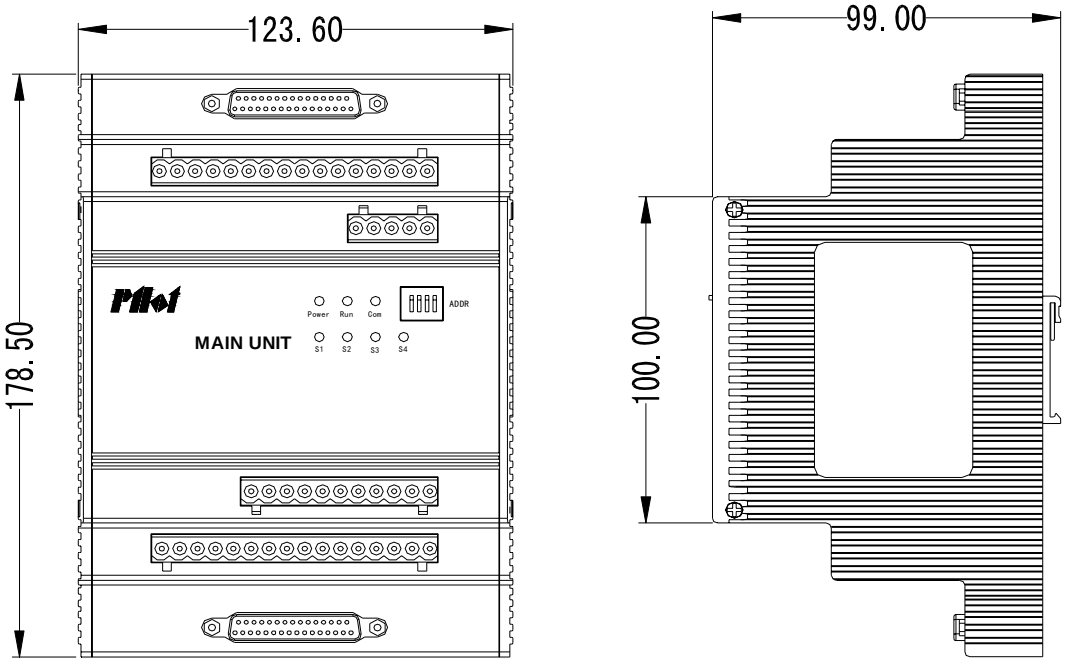
| Items | Technical Index | Standard |
|---|---|---|
| Electrostatic Discharge Immunity Test | Level 3 | IEC61000-4-2 |
| Radiated Immunity Test | Level 3 | IEC61000-4-3 |
| Electrical Fast Transient/Burst Immunity Test | Level 3 | IEC61000-4-4 |
| Surge Immunity Test | Level 3 | IEC61000-4-5 |
| Power Frequency withstand voltage | Rated Insulation Voltage≤ 300V，Test Voltage 2000V<br>Rated Insulation Voltage≤60V，Test Voltage 1000V | GB/T 17215.211-2006 |

## 2.5 Operating Environment

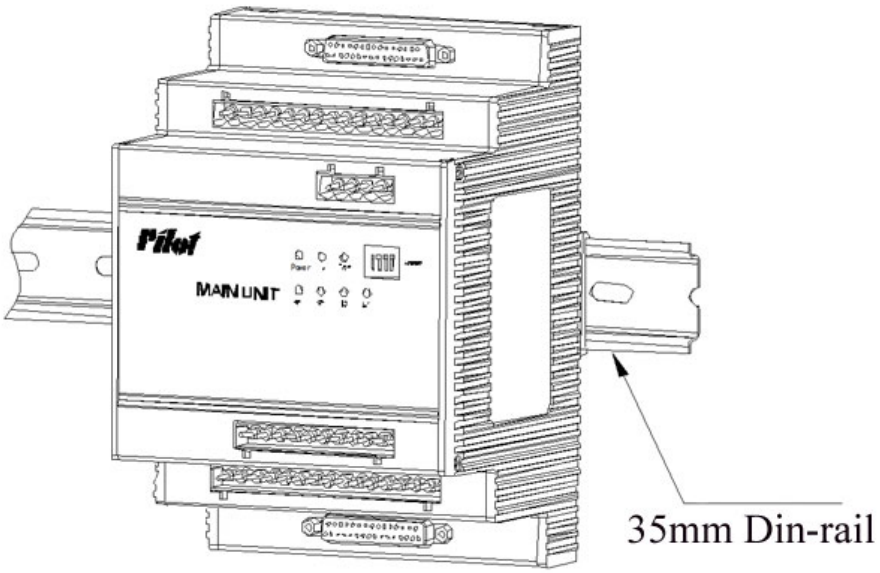
| Item | Parameter |
|---|---|
| Application Site | Indoor |
| Operating temperature | -10℃~55℃ |
| Storage temperature | -25℃~70℃ |
| Humidity | 5%~95% RH, non-condensing |
| IP Grade | IP20, HMI (front panel) IP65 |
| Insulation resistance | No less than 100MΩ，IEC62052-11 |

# 3. Installation

## 3.1 Main module Index



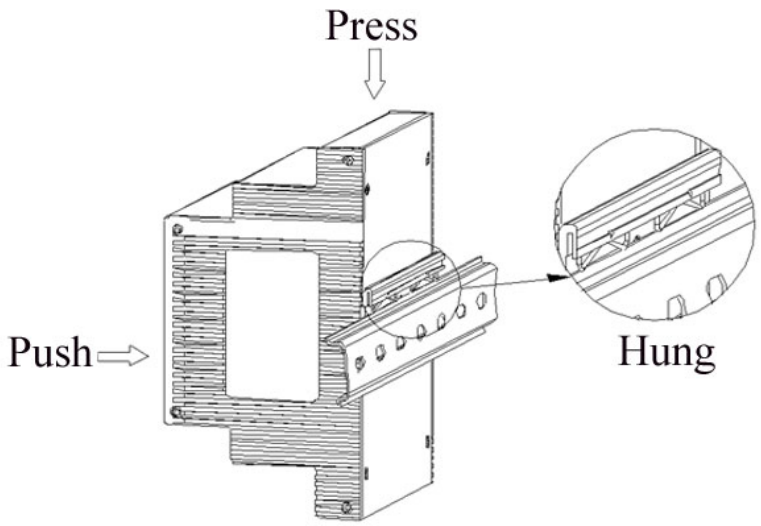

Picture 3.1 Main Module Index




Picture 3.2 Main Module Installation

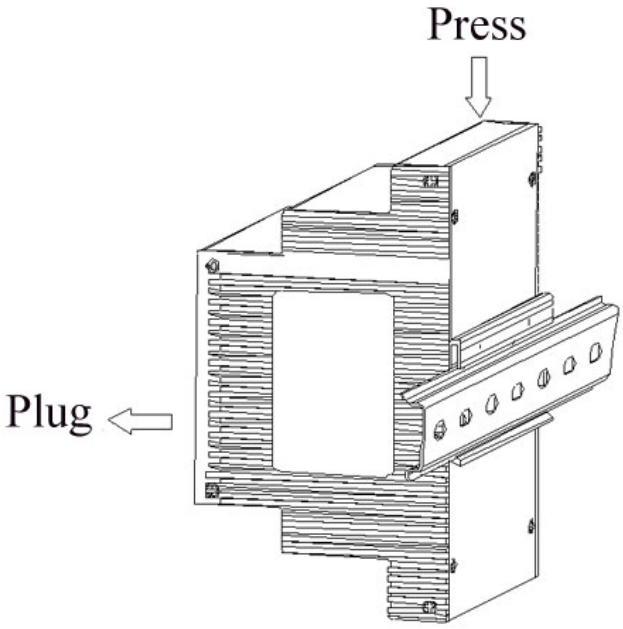
[Note]: Main Module is Din-rail installation

### 3.1.1 Main Module Installation detail drawing



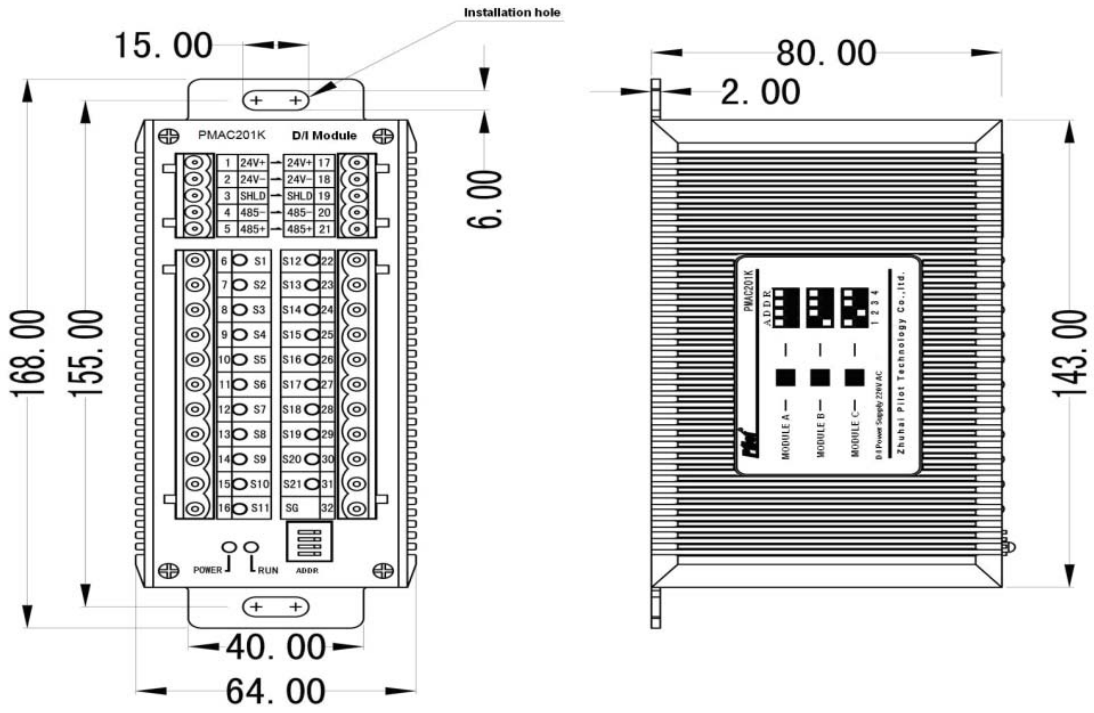

Picture 3.3 Main Module Installation detail drawing

### 3.1.2 Main Module Dismantle detail drawing




Picture 3.4 Main Module Dismantle detail drawing

## 3.2 Status Module Index



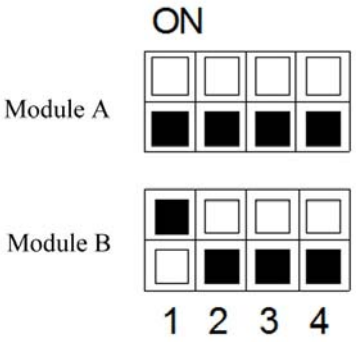

Picture 3.5 Status Module Index

Note:

1. Status Module fixed installation
2. Running Indication Light: Flash means normal working and on communication; Light normal ON, means normal working but no communication

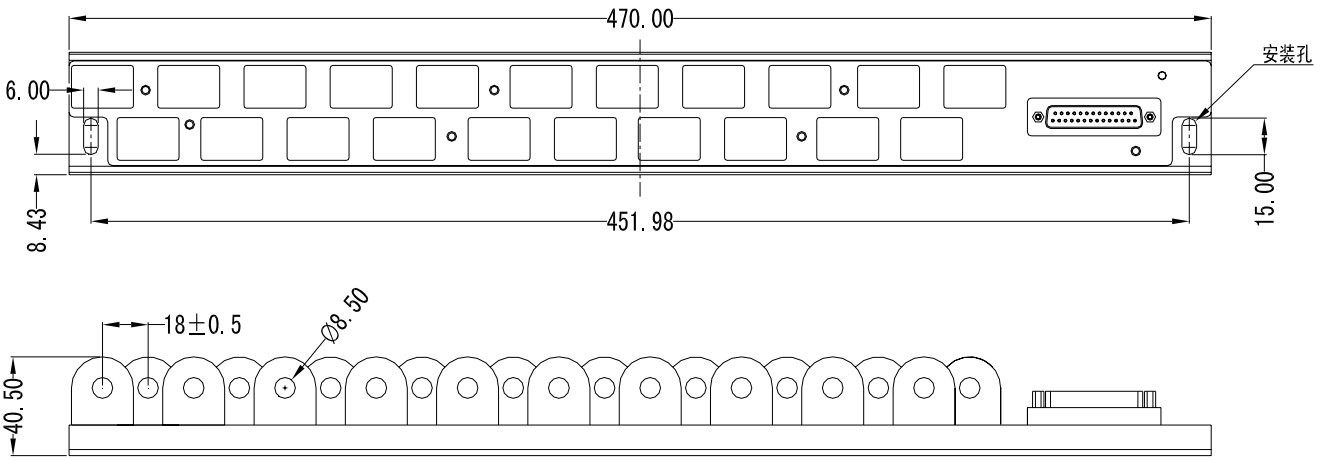
**Status Module Address setting**

One Main Module can support 2 piece 21 loop Status Module, the address of status module setting by dial switch, setting dial switch as following




Picture 3.6 Module Address

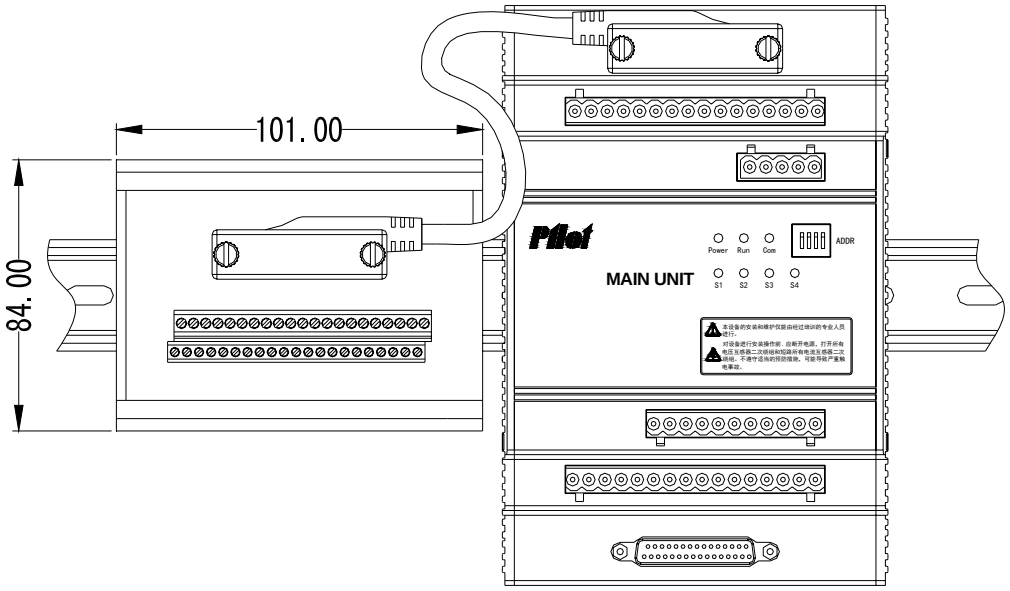
## 3.3 CT Module Installation Index




Picture 3.7 CT Module Index

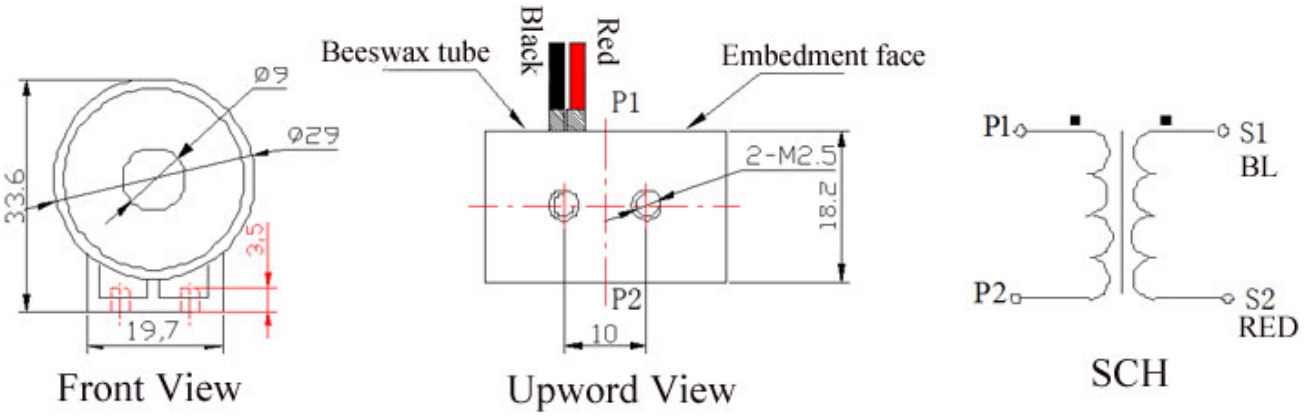
## 3.4 Outgoing Single Installation CT Index

### 3.4.1 CT Switching Module Index




Picture 3.8 CT Switching Module Index

### 3.4.2 50A Single CT Index

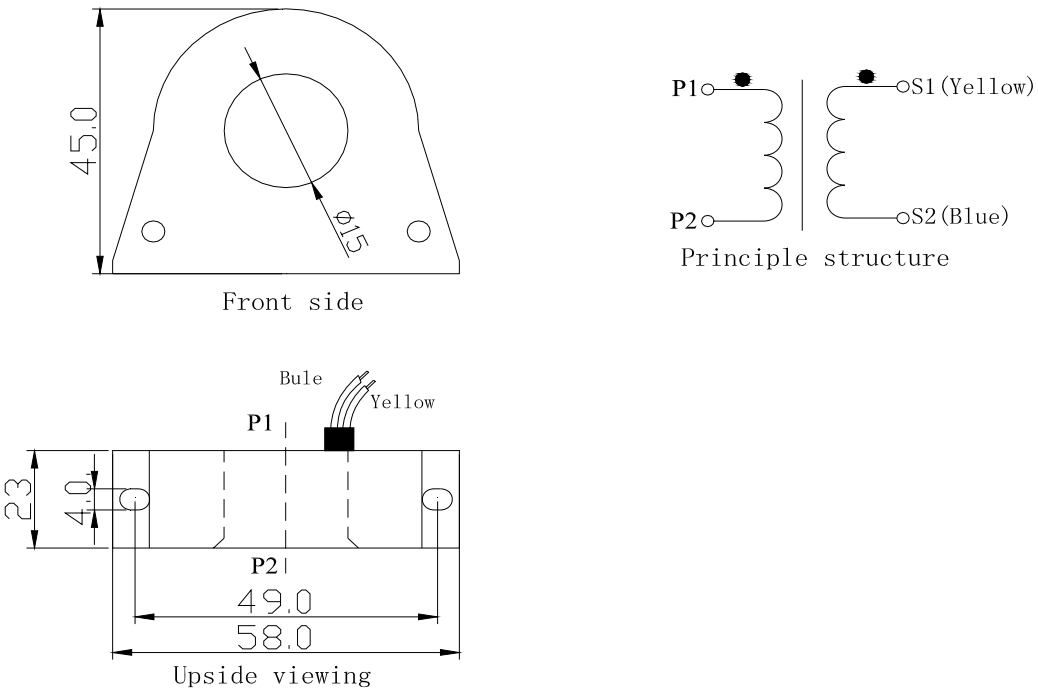



Picture 3.9 50A Single CT Index

[Note]:

Each CT equip with 2.5M cable, Black cable connect with CT Switching module same terminal. One CT Switching module can connect with 21 CT, 50A single CT be fixed by 2 M3*8 screw from bottom to rear panel

### 3.4.3 100A Single CT Index

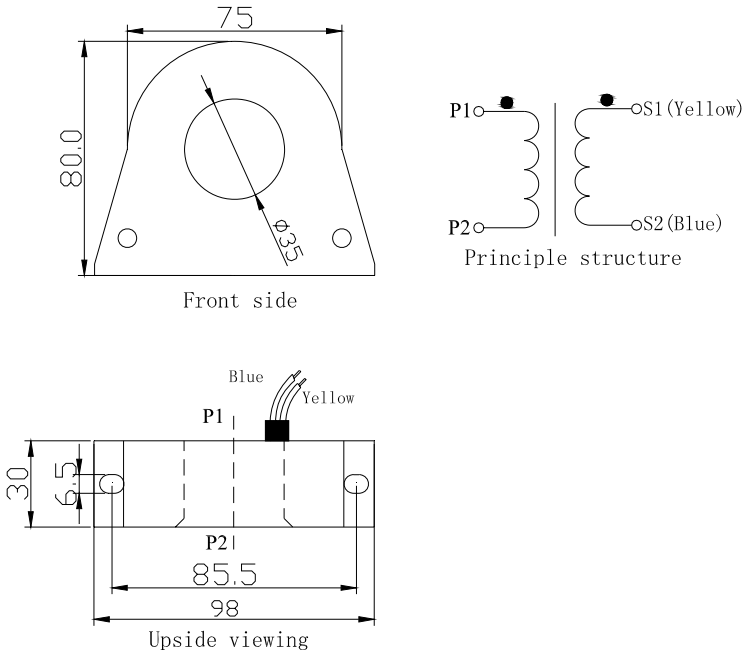



Picture 3.10 100A Single CT Index

[Note]:

Each CT equip with 2.5M cable, Yellow cable connect with CT Switching module same terminal. One CT Switching module can connect with 21 CT, 100A single CT be fixed by 2 M3*8 screw from bottom to rear panel

### 3.4.4 200A Single CT Index

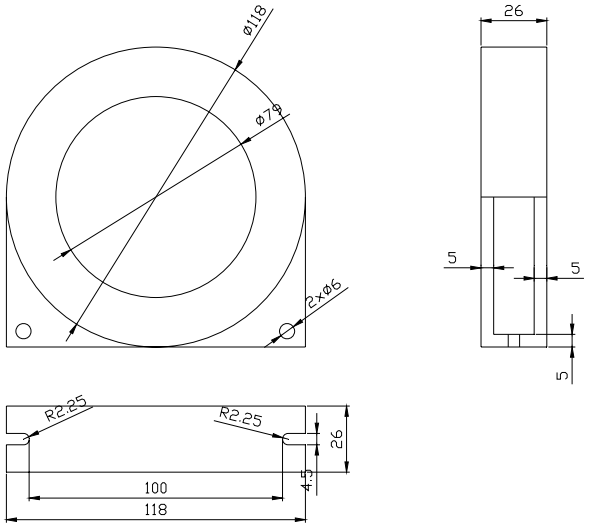



Picture 3.11 200A Single CT Index

[Note]:

Each CT equip with 2.5M cable, Yellow cable connect with CT Switching module same terminal. One CT Switching module can connect with 21 CT, 200A single CT be fixed by 2 M3*8 screw from bottom to rear panel

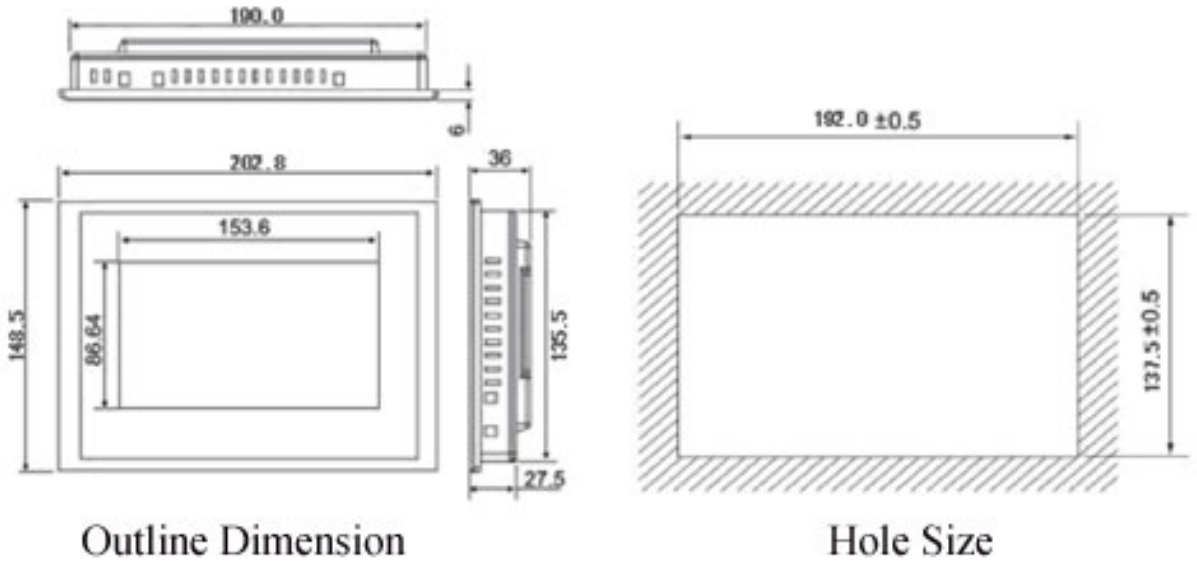
## 3.5 Incoming Line Leakage Current Transformer Index



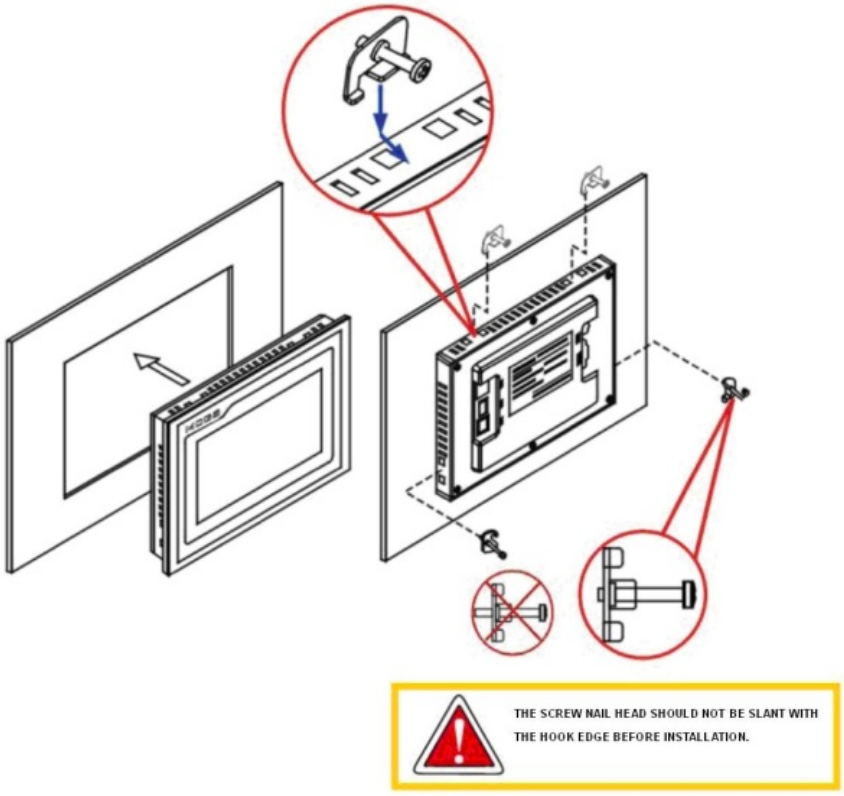

Picture 3.12 Incoming Line Leakage Current Transformer

[Note]: Incoming Line Leakage Current Transformer standard is 250A

## 3.6 HMI Module Index




Picture 3.13 HMI Module Index




Picture 3.14 HMI Installation

[Note]: HMI Embedded panel mounting

# 4. Connection Wiring

## 4.1 Main Module Terminals

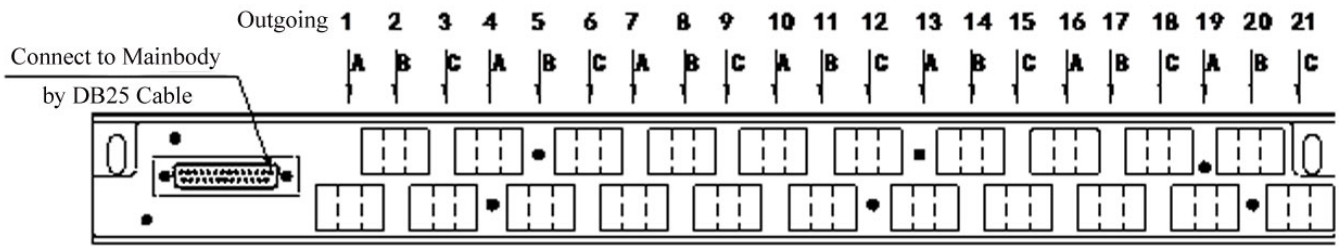
| No | Definition | Instruction | No | Definition | Instruction |
|---|---|---|---|---|---|
| 1 | VA | Incoming Line Voltage measurement input | 25 | 485A+ | 1st RS485 communication to Status module |
| 2 | NC | | 26 | SHLD | |
| 3 | VB | | 27 | SHLD | 2nd RS485 communication to HMI |
| 4 | NC | | 28 | 485B- | |
| 5 | VC | | 29 | 485B+ | |
| 6 | VN | | 30 | SHLD | 3rd RS485 communication to System |
| 7 | IN1 | Null Line Current | 31 | 485C- | |
| 8 | IN2 | | 32 | 485C+ | |
| 9 | IA1* | Incoming Line Phase A Current, * for the same terminal | 33 | VN | Null-GND line voltage measurement input |
| 10 | IA2 | | 34 | VG | |
| 11 | IB1* | Incoming Line Phase B Current, * for the same terminal | 35 | PT- | PT100 input |
| 12 | IB2 | | 36 | PT+ | |
| 13 | IC1* | Incoming Line Phase C Current, * for the same terminal | 37 | RL21 | Relay 2 |
| 14 | IC2 | | 38 | RL22 | |
| 15 | I△+ | Leakage Current | 39 | RL11 | Relay 1 |
| 16 | I△- | | 40 | RL12 | |
| 17 | 24V2- | 24V DC power supply 2 | 41 | Pulse- | kWh Pulse output |
| 18 | 24V2+ | | 42 | Pulse+ | |
| 19 | NC | Null | 43 | NC | Null |
| 20 | 24V1- | 24V DC power supply 1 | 44 | S4 | 1-4 DI Status |
| 21 | 24V1+ | | 45 | S3 | |
| 22 | 24VO- | 24V DC power output | 46 | S2 | |
| 23 | 24VO+ | | 47 | S1 | |
| 24 | 485A- | 1st RS485 communication | 48 | DC | DI Status Common Terminal |

## 4.2 Switching Value Module Terminals

| No | Definition | Instruction | No | Definition | Instruction |
|---|---|---|---|---|---|
| 1 | 24V+ | Positive pole of 24V power supply input | 17 | 24V+ | Positive pole of 24V power supply output |
| 2 | 24V- | Negative pole of 24V power supply input | 18 | 24V- | Negative pole of 24V power supply output |
| 3 | SHLD | Shielded earth | 19 | SHLD | Shielded earth |
| 4 | 485A- | 485 - | 20 | 485A- | 485 - |
| 5 | 485A+ | 485 + | 21 | 485A+ | 485 + |
| 6 | S1 | DI 1 Input | 22 | S12 | DI 12 Input |
| 7 | S2 | DI 2 Input | 23 | S13 | DI 13 Input |
| 8 | S3 | DI 3 Input | 24 | S14 | DI 14 Input |
| 9 | S4 | DI 4 Input | 25 | S15 | DI 15 Input |
| 10 | S5 | DI 5 Input | 26 | S16 | DI 16 Input |
| 11 | S6 | DI 6 Input | 27 | S17 | DI 17 Input |
| 12 | S7 | DI 7 Input | 28 | S18 | DI 18 Input |
| 13 | S8 | DI 8 Input | 29 | S19 | DI 19 Input |
| 14 | S9 | DI 9 Input | 30 | S20 | DI 20 Input |
| 15 | S10 | DI 10 Input | 31 | S21 | DI 21 Input |
| 16 | S11 | DI 11 Input | 32 | SG | DI Status Common Terminal |

## 4.3 CT Module Terminals

One CT module can connect with 21 branch circuits, each branch circuit cross the CT follow by phase ABC and repeated as below:

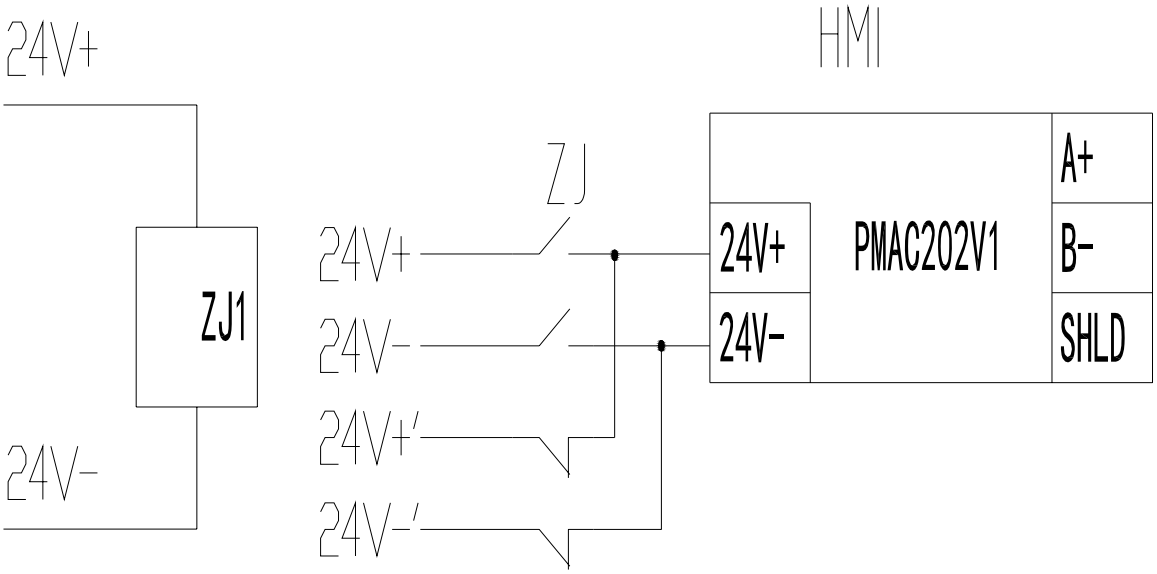


## 4.4 HMI Power Connection

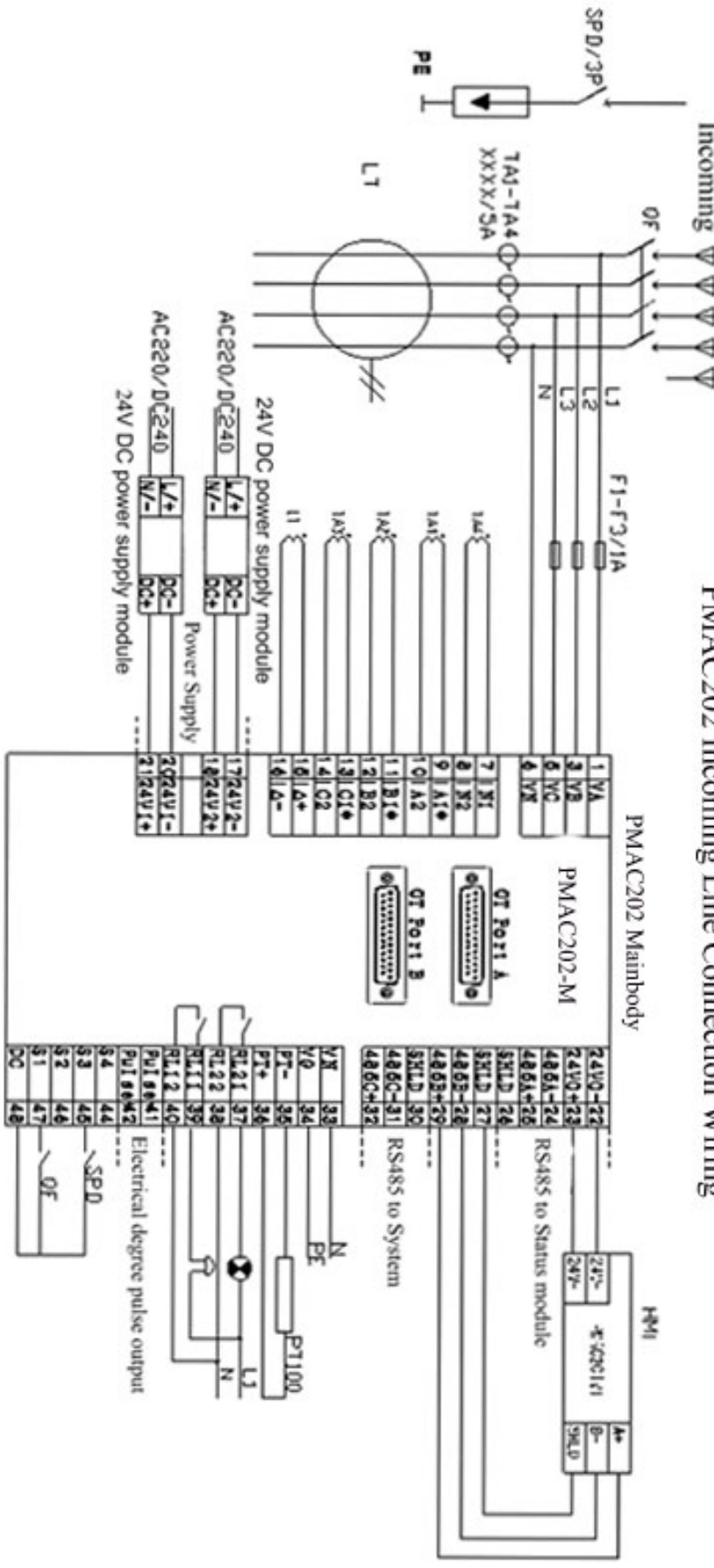
HMI Power Supply is DC 24V, there are two kinds connection wiring:

1. If there is no Status Module, power supply from Main Module 24V DC power supply output terminal
2. If has Status module, power supply from last status module 24V DC power supply output terminal

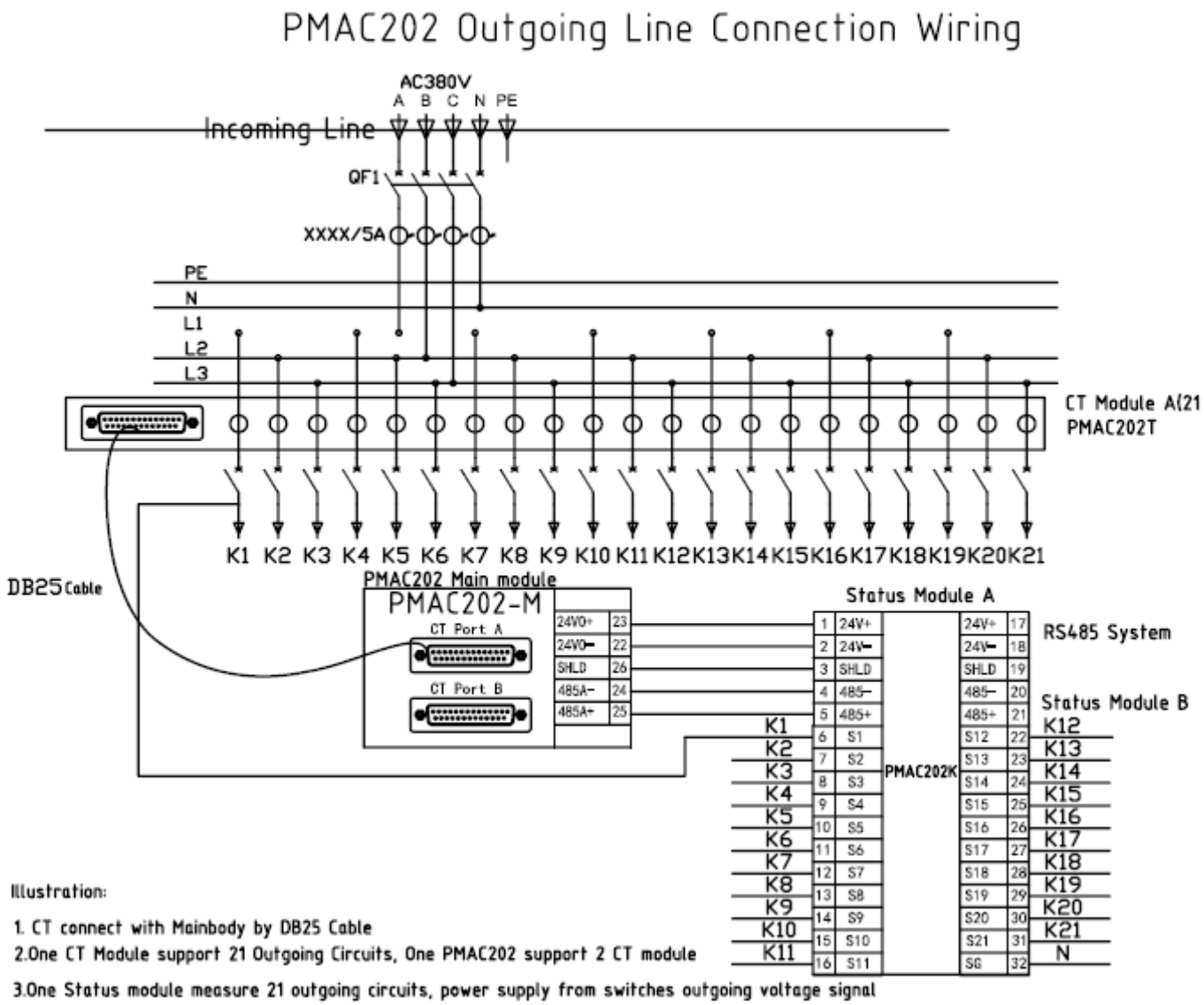
For Two way Imcoming line can exchange HMI power supply by one 24V relay, as following picture:



## 4.5 Incoming Line Connection Wiring

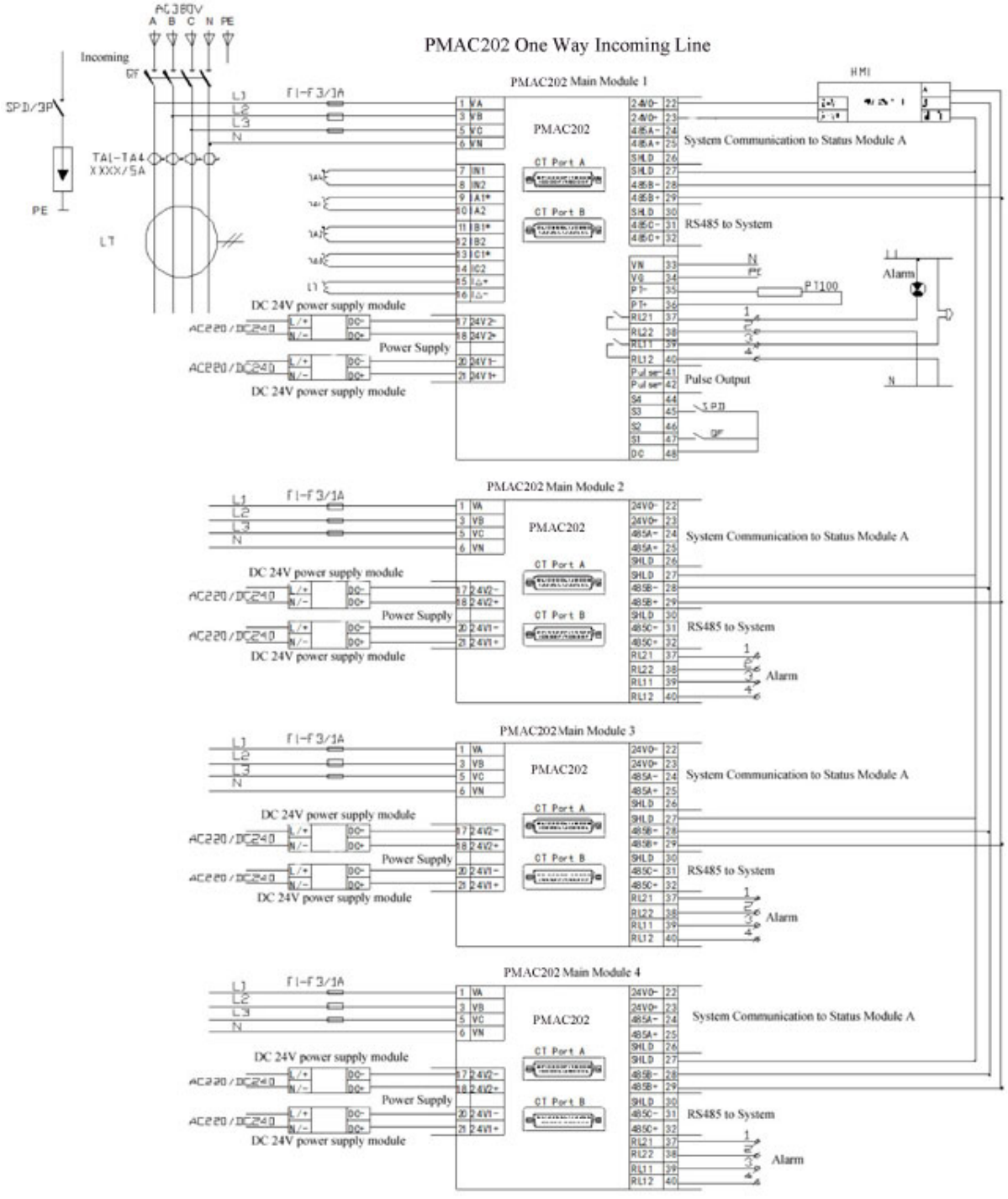


## 4.6 Outgoing Line Connection Wiring




Note: When there is just one 21 loop CT module, the CT module just can connect with Main module PortA

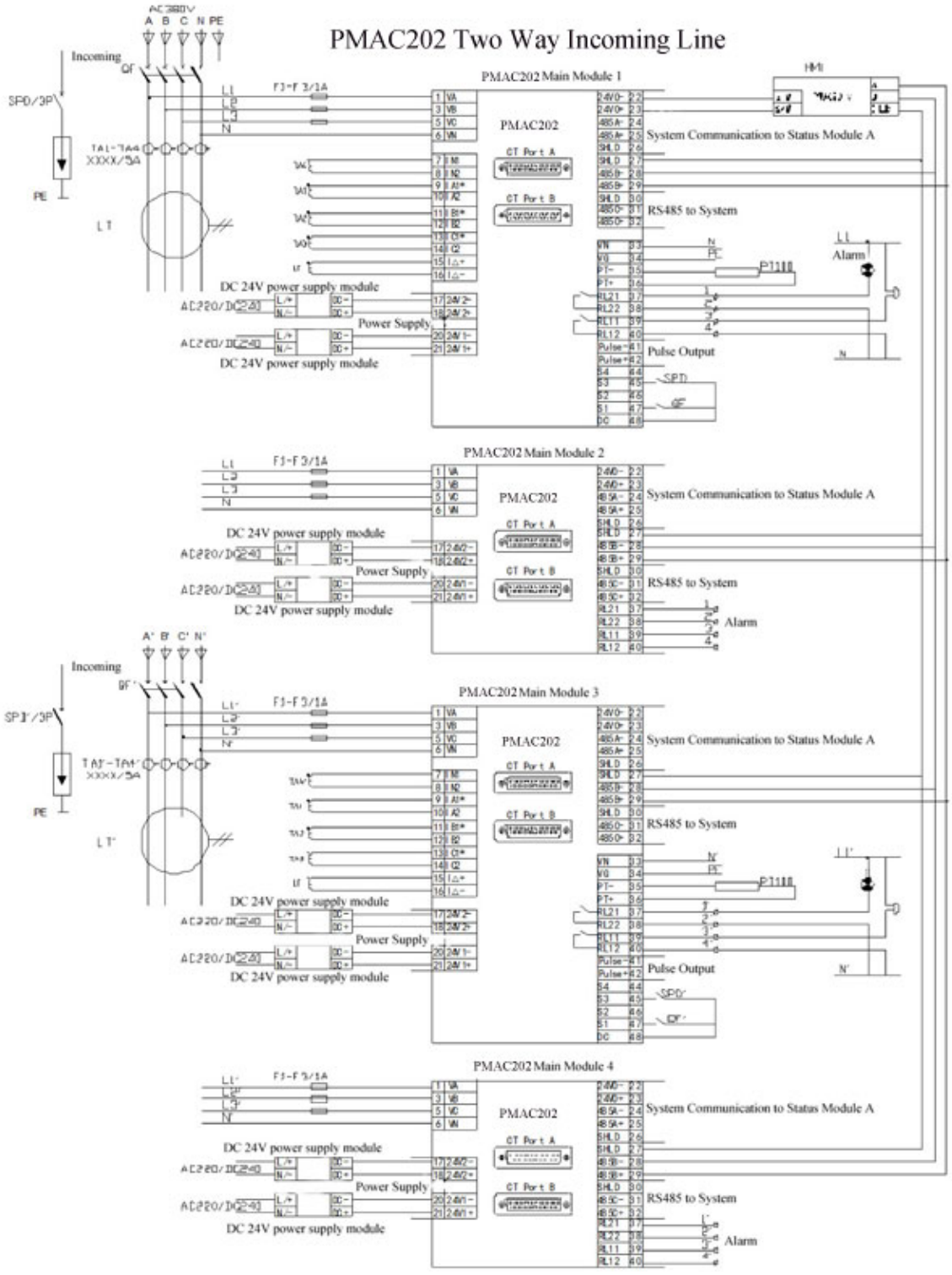
## 4.7 One Way Incoming Line System Connection Wiring




**Different Outgoing Line Circuits Configuration table:**

| Outgoing Line Circuits | Main Module 1 | Main Module 2 | Main Module 3 | Main Module 4 | Note |
|---|---|---|---|---|---|
| 21 or 42 | ■ | □ | □ | □ | ■Configuration needed<br>□Configuration no need |
| 63 or 84 | ■ | ■ | □ | □ | |
| 105 or 126 | ■ | ■ | ■ | □ | |
| 147 or 168 | ■ | ■ | ■ | ■ | |

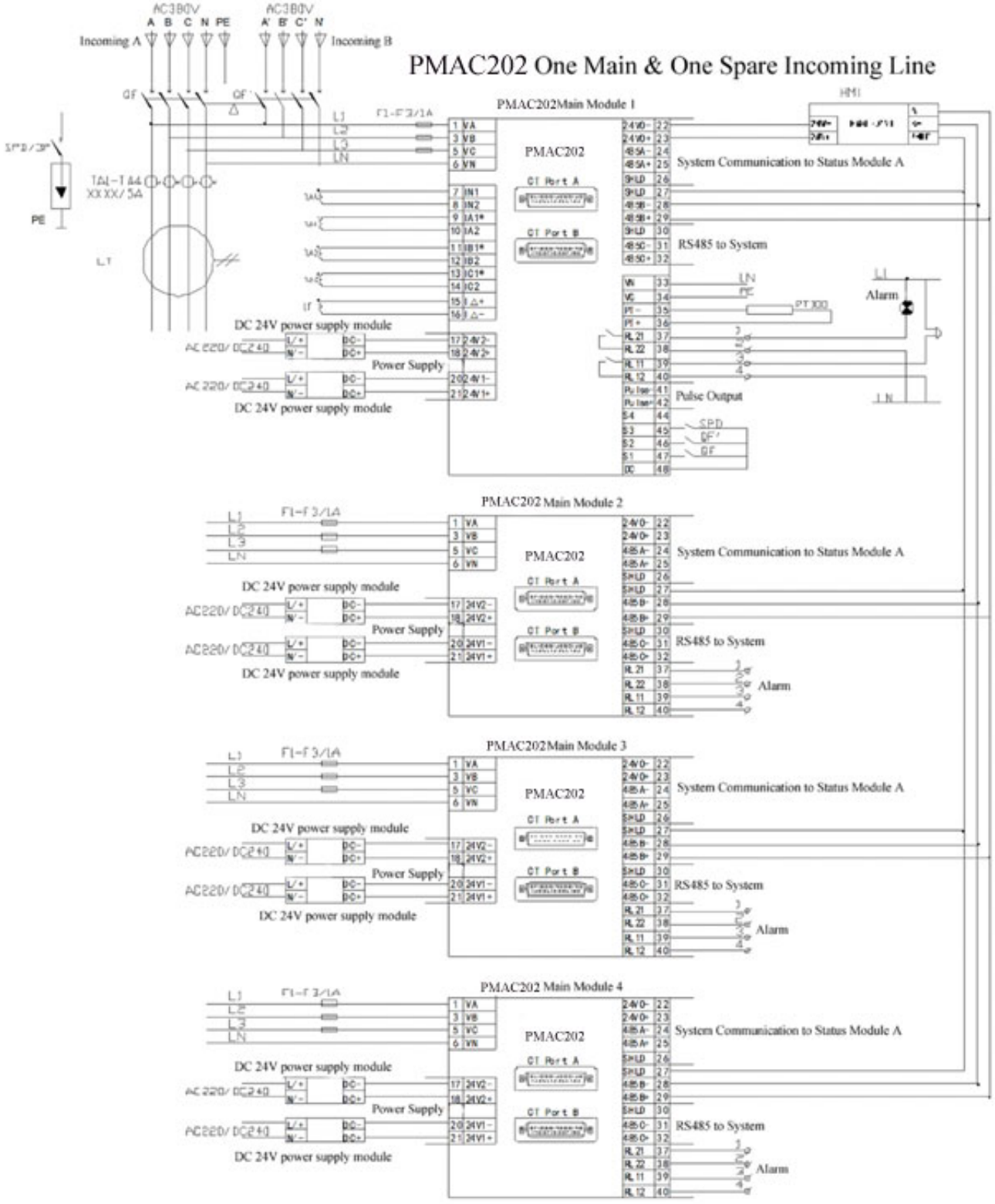
## 4.8 Two Way Incoming Line System Connection Wiring




**Different Outgoing Line Circuits Configuration table:**

| Outgoing Line Circuits | Main Module 1 | Main Module 2 | Main Module 3 | Main Module 4 | Note |
|---|---|---|---|---|---|
| 21 or 42 | ■ | □ | ■ | □ | ■Configuration needed |
| 63 or 84 | ■ | ■ | ■ | ■ | □Configuration no need |

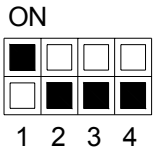
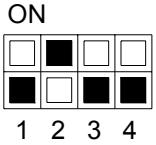
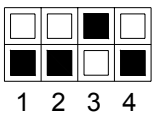
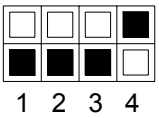
## 4.9 One Main & One Backup Incoming Line System Connection Wiring



**Different Outgoing Line Circuits Configuration table:**

| Outgoing Line Circuits | Main Module 1 | Main Module 2 | Main Module 3 | Main Module 4 | Note |
|---|---|---|---|---|---|
| **21 or 42** | ■ | □ | □ | □ | ■Configuration needed<br>□Configuration no need |
| **63 or 84** | ■ | ■ | □ | □ | |
| **105 or 126** | ■ | ■ | ■ | □ | |
| **147 or 168** | ■ | ■ | ■ | ■ | |

## 4.10 Multi Main Module Address Setting

| Module | Main Module Dial Switch Setting |
|---|---|
| PMAC202 1 |  |
| PMAC202 2 |  |
| PMAC202 3 |  |
| PMAC202 4 |  |

# 5. Display and Operation

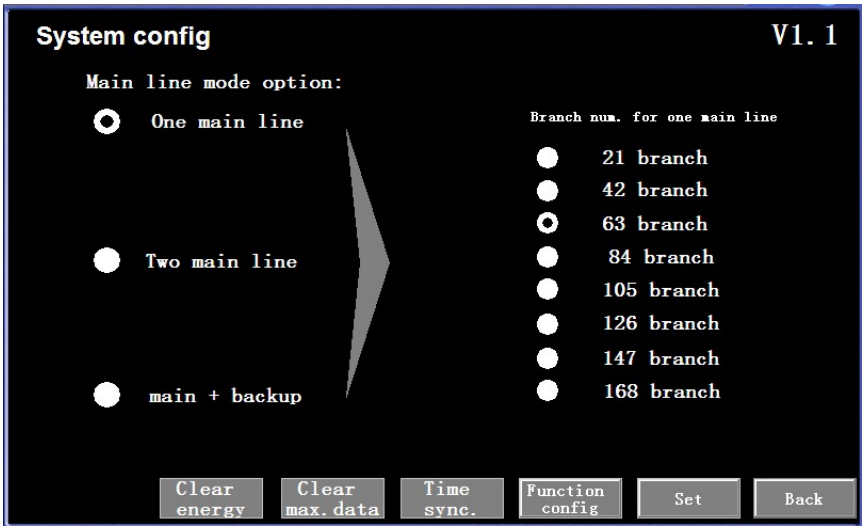
## 5.1 System Configuration

After Power On, power meter display real time data, under real time data interface, press “System Config” button to enter into system configuration interface

| Notice |
| --- |
| After Power ON, should finish Incoming line mode selection and Outgoing line circuits selection setting first, then to setting other parameters |

### 5.1.1 One way Incoming Line Configuration

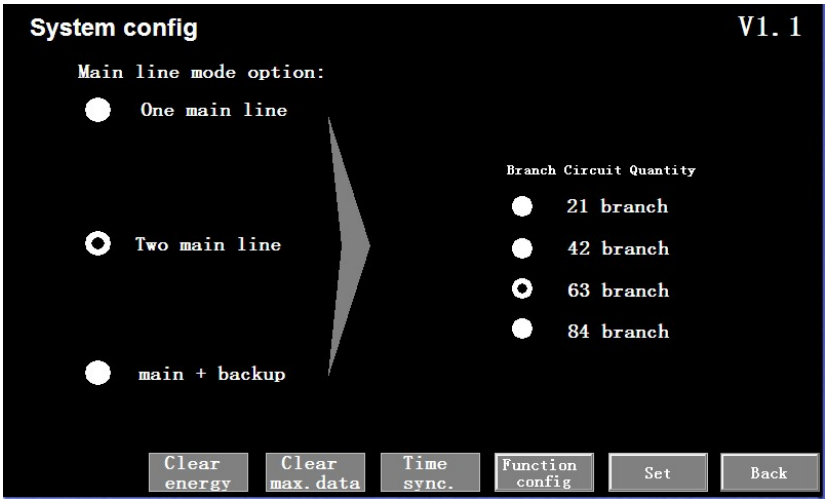
Configuration as One way incoming line mode, as picture 5.1




Picture 5.1

### 5.1.2 Two way Incoming Line Configuration

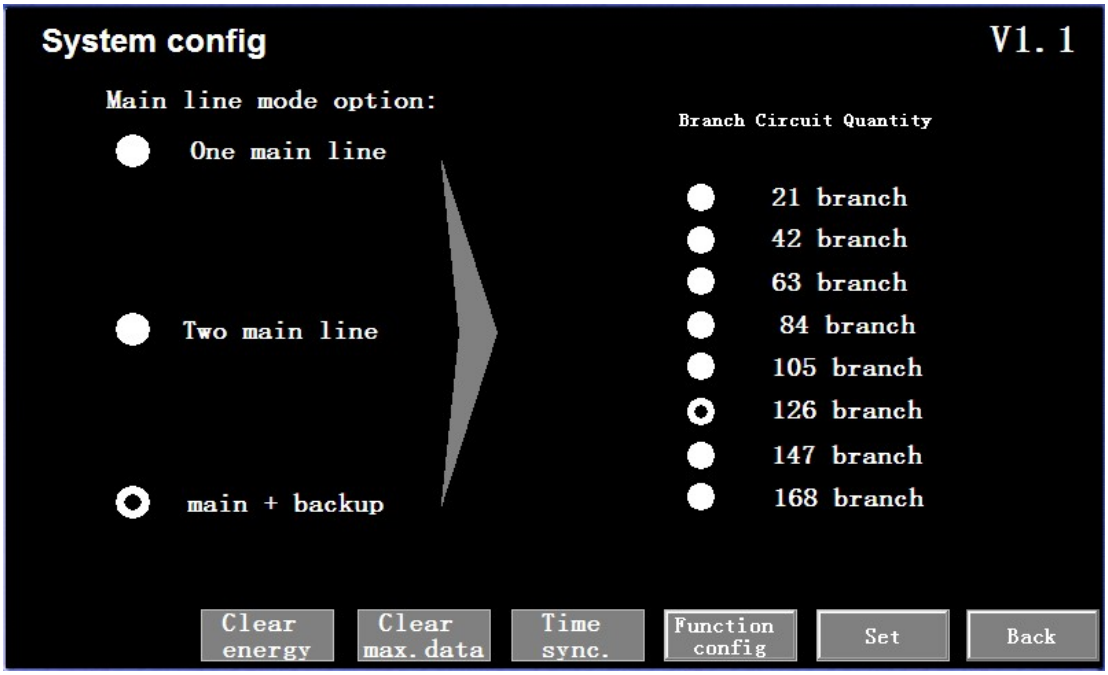
Configuration as Two way incoming line mode, as picture 5.2




Picture 5.2

### 5.1.3 One Main & One Backup Incoming Line Configuration

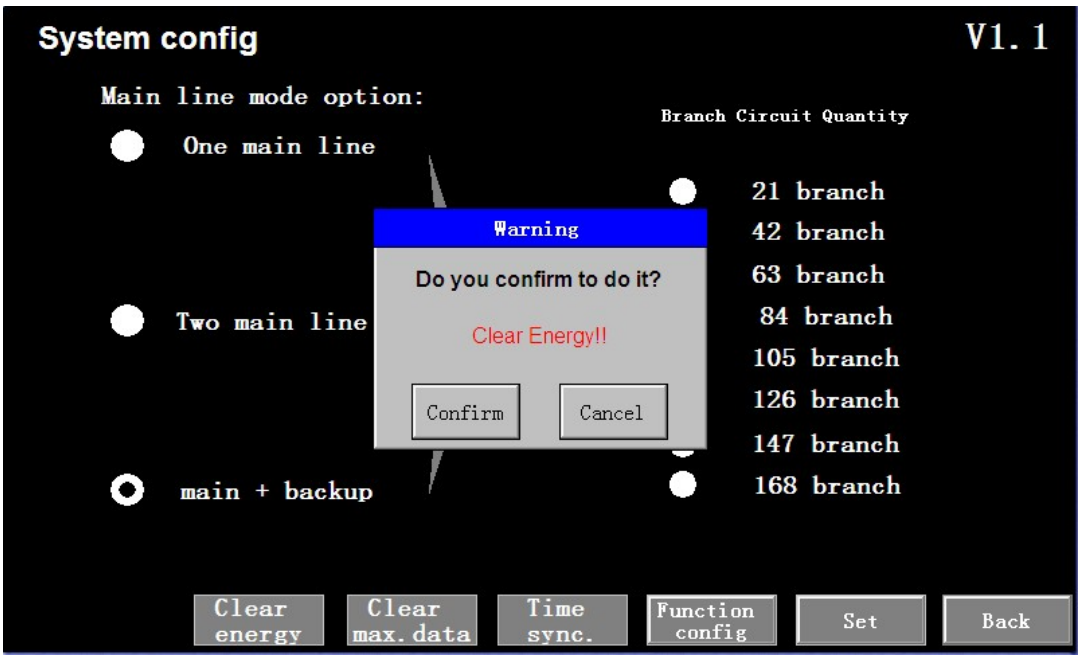
Configuration as Main & Backup incoming line mode, as picture 5.3




Picture 5.3

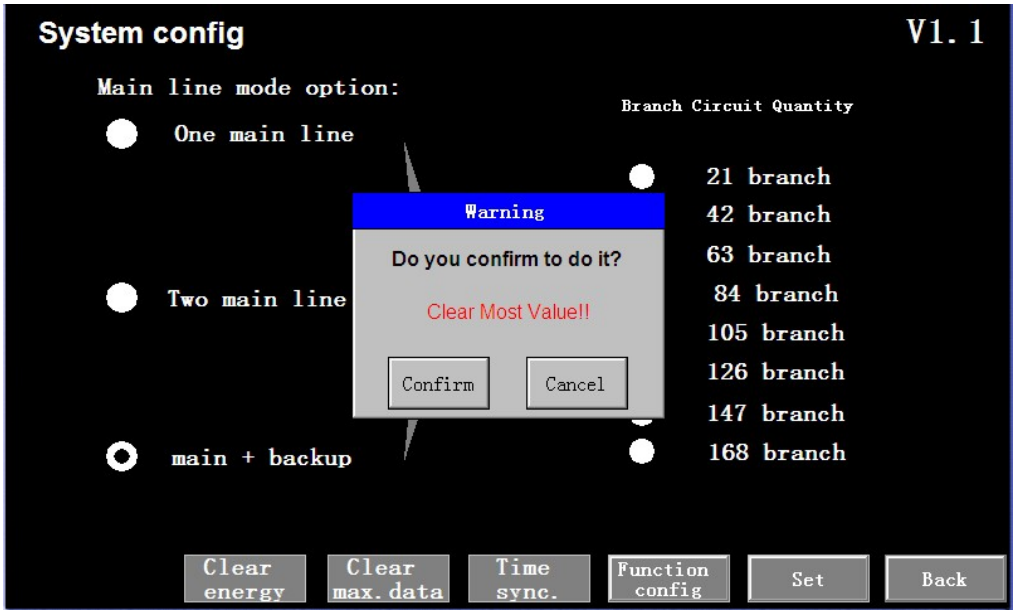
### 5.1.4 Clear Energy

Clear Main Module Energy, as picture 5.4



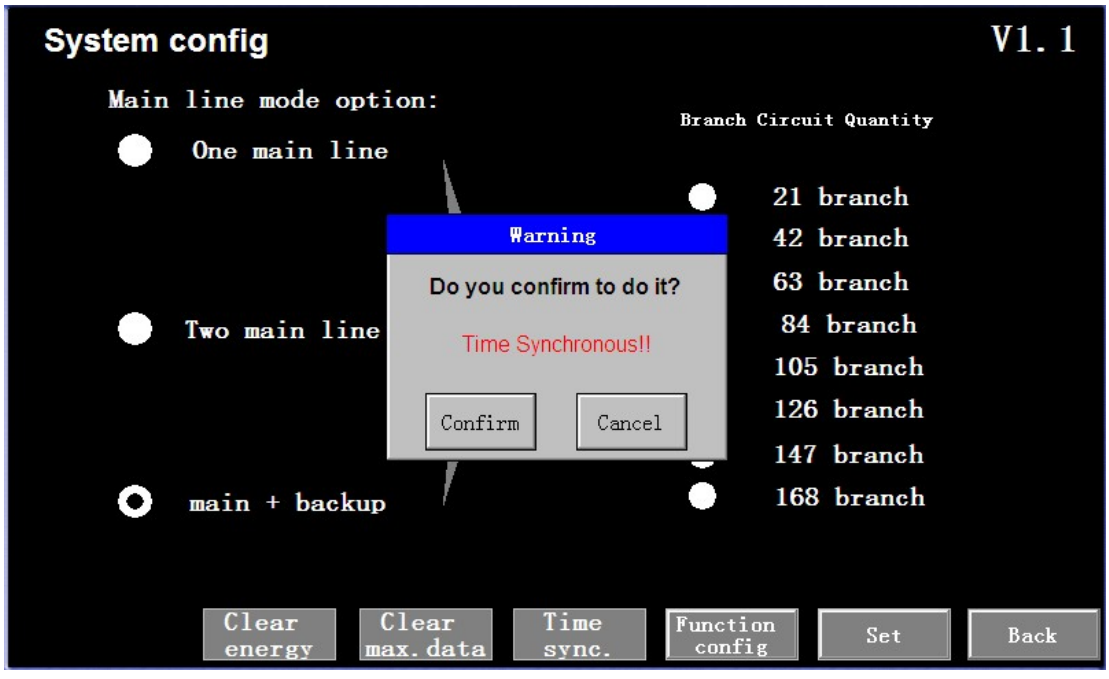

Picture 5.4

### 5.1.5 Clear Maxim Value




Clear max.data Clear all the Maxim value information in Main Module, e.g. Maxim Current value, Maxim Current Demand etc

### 5.1.6 Time Synchronization




Time sync. Synchronization time on HMI and Main Module

### 5.1.7 Function Configuration

Exchange to Information setting interface, as picture 5.5

### 5.1.8 Setting

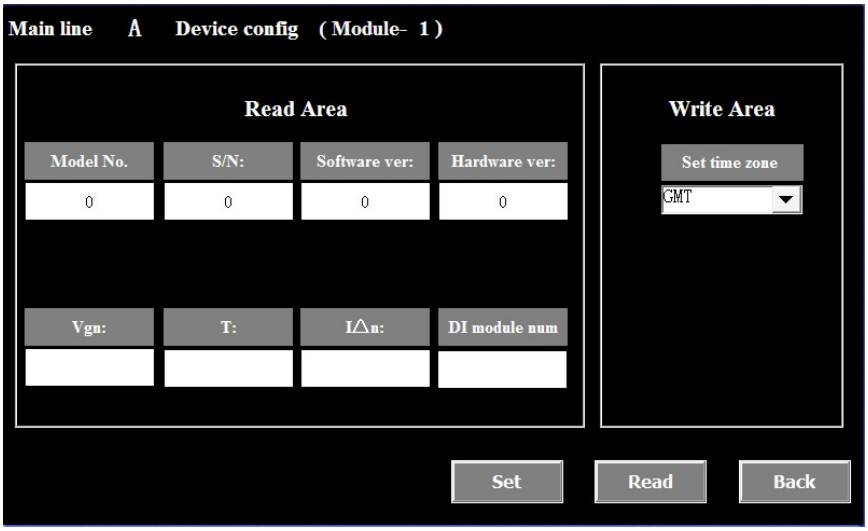
Press SET, after input correct password for further operation

### 5.1.9 Password Input

when setting Incoming line Clear Maxim value, Time Synchronization, Function Configuration, Set system configuration, password input table will be shown, further operation can be processed after input correct password. Default password: 201

### 5.1.10 Password Modification


**Device Information setting interface:**

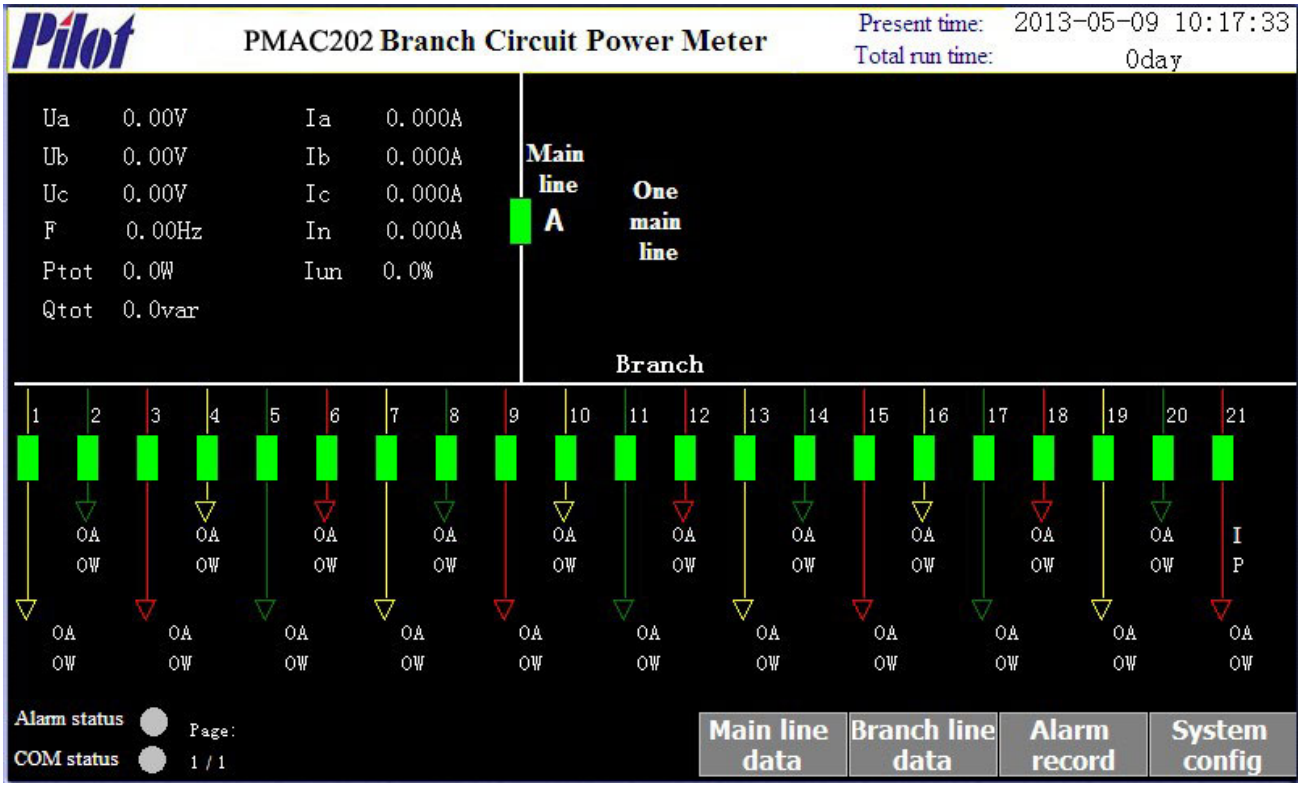



Picture 5.5

## 5.2 Data Display

### 5.2.1 Real Time Data Display

Power on the display module you can enter into main interfaced display as below picture 5.6, Display real-time data of one or two incoming line circuit and 21 branch outgoing circuit as well as the status of switch.




Picture 5.6

### 5.2.2 Switch status display

Incoming Switch:  Is the condition of Incoming Line switch 1 status, green means “OFF”, red means “ON”. flash means Out-of-Order

Outgoing Switch:  Is the condition of Switch, green means “OFF”, red means “ON”. flash means Out-of-Order

### 5.2.3 Alarm display


The alarm light will turn red and flash when event happen. Gray means no alarm.

### 5.2.4 Communication Status Indicate

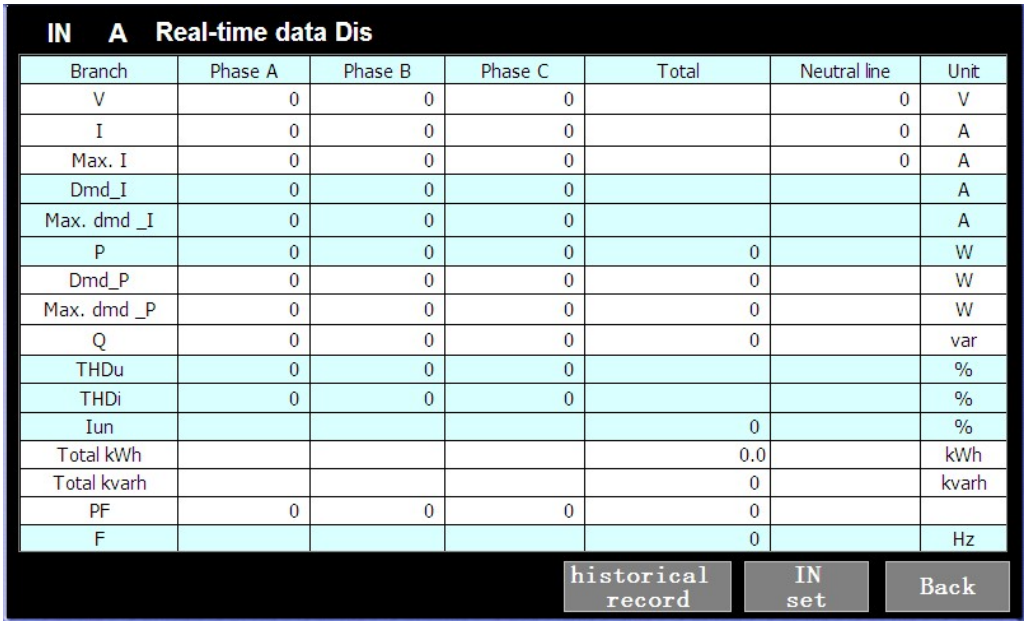

Green means the communication between display module and main module is normal. Gray means no communication.

### 5.2.5 Key Operation

**Next**: Exchange to next System Interface
**Incoming Data**: Exchange to Incoming data display interface
**Outgoing Data**: Exchange to Outgoing data display interface
**Alarm Record**: Exchange to Real-time alarm record interface
**System Configuration**: Exchange to system configuration interface

## 5.3 Incoming Circuit Data Display

Display 1 loop incoming circuit real time data, as picture 5.7

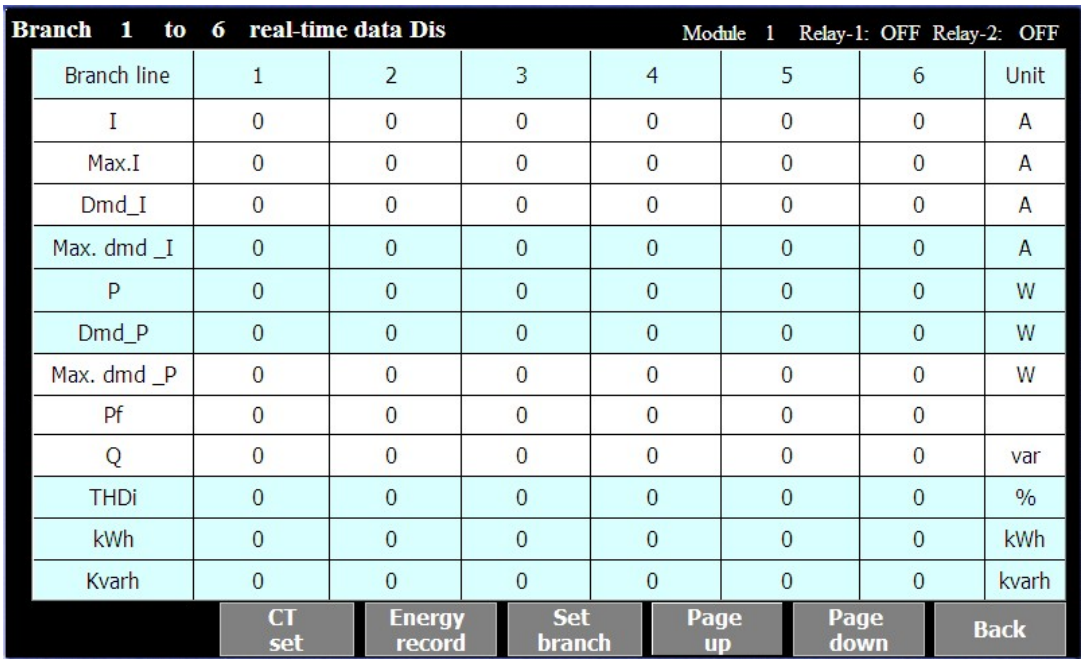



| Branch | Phase A | Phase B | Phase C | Total | Neutral line | Unit |
|---|---|---|---|---|---|---|
| V | 0 | 0 | 0 | | 0 | V |
| I | 0 | 0 | 0 | | 0 | A |
| Max. I | 0 | 0 | 0 | | 0 | A |
| Dmd_I | 0 | 0 | 0 | | | A |
| Max. dmd _I | 0 | 0 | 0 | | | A |
| P | 0 | 0 | 0 | 0 | | W |
| Dmd_P | 0 | 0 | 0 | 0 | | W |
| Max. dmd _P | 0 | 0 | 0 | 0 | | W |
| Q | 0 | 0 | 0 | 0 | | var |
| THDu | 0 | 0 | 0 | | | % |
| THDi | 0 | 0 | 0 | | | % |
| Iun | | | | 0 | | % |
| Total kWh | | | | 0.0 | | kWh |
| Total kvarh | | | | 0 | | kvarh |
| PF | 0 | 0 | 0 | 0 | | |
| F | | | | 0 | | Hz |

Picture 5.7

## 5.4 Outgoing Circuit Data Display

Display multi loop outgoing circuit real time data, as picture 5.8

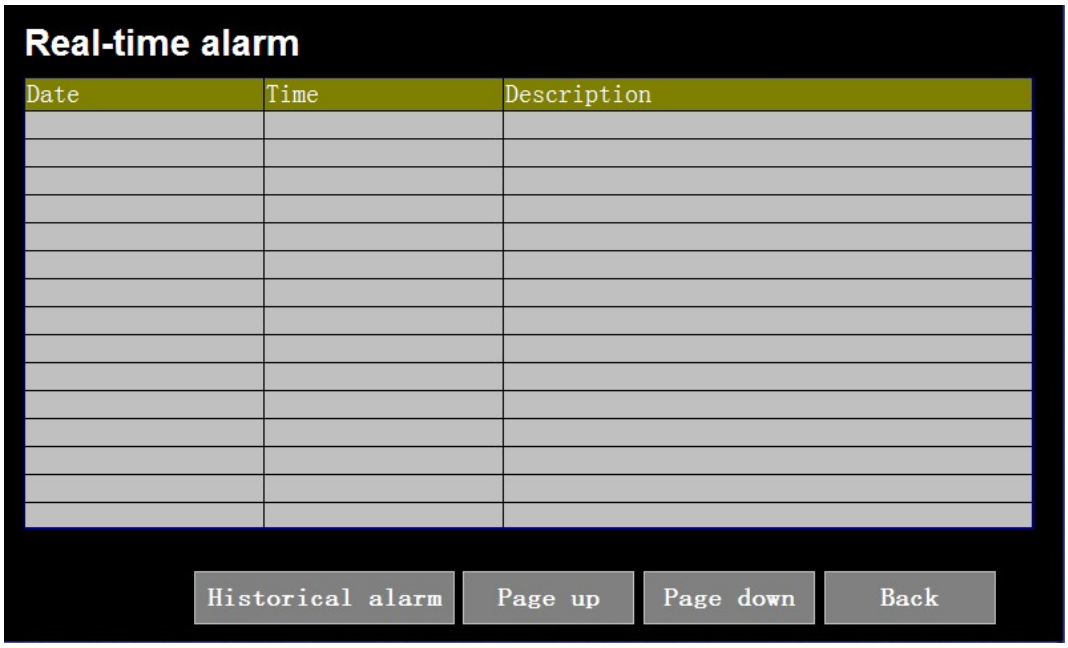



| Branch line | 1 | 2 | 3 | 4 | 5 | 6 | Unit |
|---|---|---|---|---|---|---|---|
| I | 0 | 0 | 0 | 0 | 0 | 0 | A |
| Max.I | 0 | 0 | 0 | 0 | 0 | 0 | A |
| Dmd_I | 0 | 0 | 0 | 0 | 0 | 0 | A |
| Max. dmd _I | 0 | 0 | 0 | 0 | 0 | 0 | A |
| P | 0 | 0 | 0 | 0 | 0 | 0 | W |
| Dmd_P | 0 | 0 | 0 | 0 | 0 | 0 | W |
| Max. dmd _P | 0 | 0 | 0 | 0 | 0 | 0 | W |
| Pf | 0 | 0 | 0 | 0 | 0 | 0 | |
| Q | 0 | 0 | 0 | 0 | 0 | 0 | var |
| THDi | 0 | 0 | 0 | 0 | 0 | 0 | % |
| kWh | 0 | 0 | 0 | 0 | 0 | 0 | kWh |
| Kvarh | 0 | 0 | 0 | 0 | 0 | 0 | kvarh |

Picture 5.8

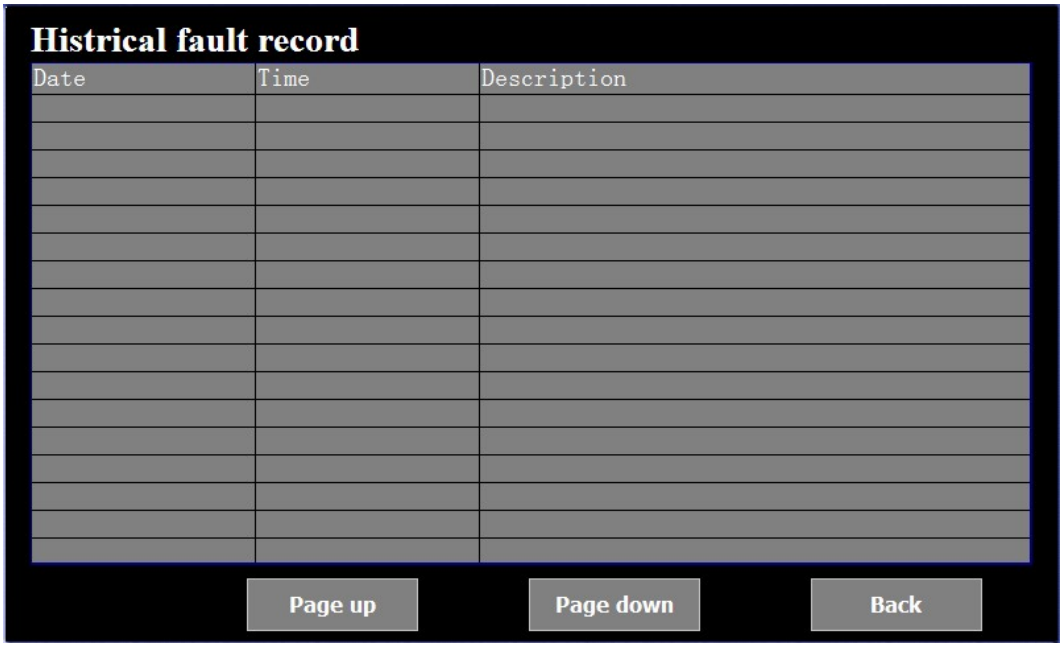
## 5.5 Real-time Alarm Record Display

Display Maxim 16 pieces alarm information, as picture 5.9




Picture 5.9

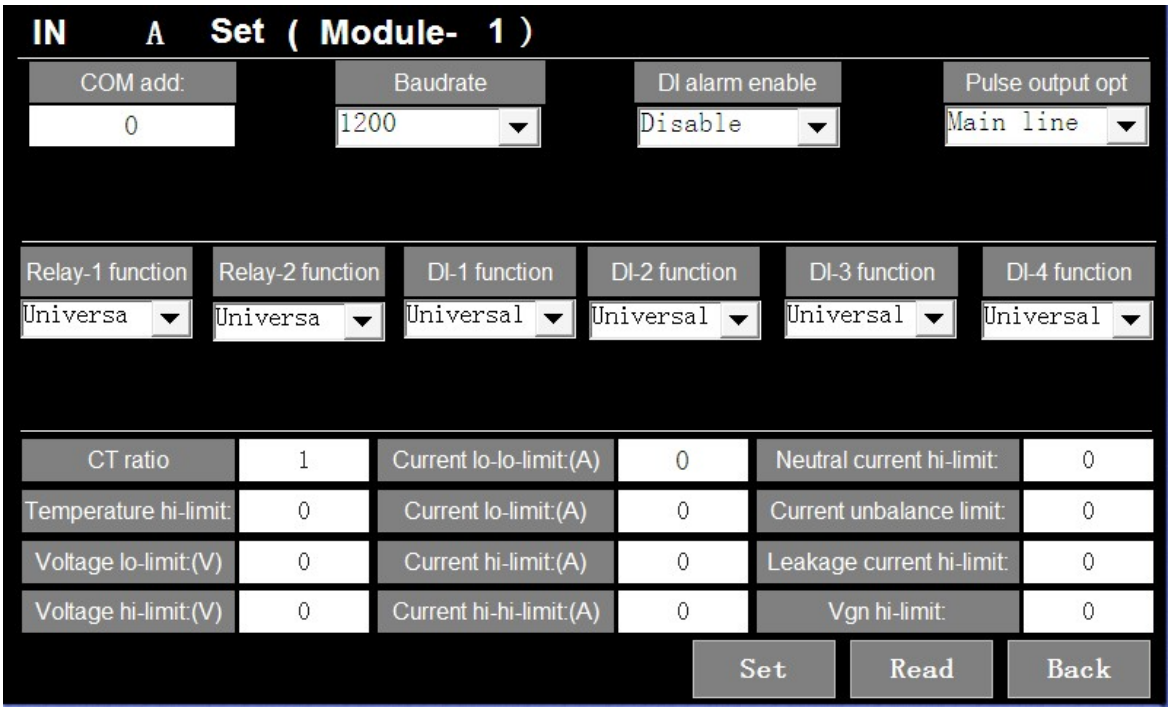
History Information Record:




Picture 5.10

## 5.6 Incoming Circuit Value Programming

Configure Incoming line circuit parameters and alarm value, as picture 5.11



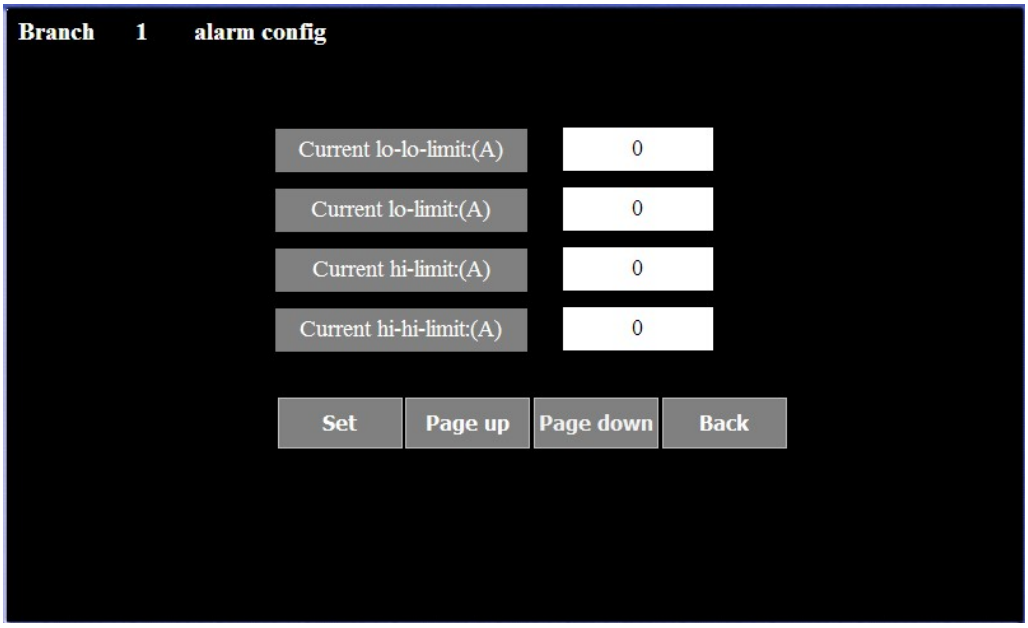

Picture 5.11

| Items | Range of data | Definition |
|---|---|---|
| Communication Add | 1～247 | Initial value is 1 |
| CT Ratio | 1～100 | Initial value is 1 |
| Baud Rate | 1200、2400、4800、9600、19200 or 38400 | Initial value is 19200 |
| DI Alarm Enabled | Enable, Disable | Enable: Permit DI alarm<br>Disable: Forbid DI alarm |
| Pulse Output Option | Main line, Branch 1-42 | Incoming Circuit: Energy pulse output option is incoming<br>Outgoing Circuit: Energy pulse output option to each relative outgoing circuit |
| Relay function | Universal Relay<br>RUN Indication<br>Alarm<br>In Alarm<br>Out Alarm | Universal relay: can be controlled by Modbus function code 05.<br>Equipment working instruction: act after equipment work.<br>Alarm output: act after main or branch circuit alarm.<br>Incoming line branch circuit alarm: act after main circuit alarm.<br>Outgoing line branch circuit alarm: act after branch circuit alarm.<br>Relay initial setting: Relay 1 & 2 are all alarm output |

| | | |
|---|---|---|
| Switch Status function | Universal switch, Incoming line switch, Surge protection switch | Surge protection switch: Incoming line switch status can be setting as lighting protection switch, after setting, the main interface will has a lighting protection switch display. If the switch OFF then means the lighting protection switch OFF |
| Current low-low level alarm value | 5~650A, 0 means alarm closed | Alarm action: over 0 and less than setting value.<br>Alarm reset: delay 5s after the alarm condition is eliminated. |
| Current low level alarm value | 5~650A, 0 means alarm closed. | Alarm action: over low-low level alarm value and smaller than setting value.<br>Alarm reset: delay 5s after the alarm condition is eliminated. |
| Current high level alarm value | 5.0~650A, 0 means alarm closed. | Alarm action: over the setting value and smaller than low-low level alarm value.<br>Alarm reset: delay 5s after the alarm condition is eliminated. |
| Current high-high level alarm value | 5.0~650A, 0 means alarm closed. | Alarm action: over the setting value.<br>Alarm reset: delay 5s after the alarm condition is eliminated. |
| Neutral current high level alarm value | 5.0~650A, 0 means alarm closed. | Alarm action: the current value is over the setting value.<br>Alarm reset: delay 5s after the alarm condition is eliminated. |
| Current unbalance rate alarm value | 5.0~100%, 0 means alarm closed. | Alarm action: over than the setting value.<br>Alarm reset: delay 5s after the alarm condition is eliminated.<br>Unbalance calculation formula:<br>(Imax-Imin)/Imax×100%<br>Imax: 3 phase current maxim value<br>Imin: 3 phase current minimum value |
| Voltage low level alarm value | 20~300V, 0 means alarm closed. | Alarm action: over 0 and smaller than setting value.<br>Alarm reset: delay 5s after the alarm condition is eliminated. |
| Voltage high level alarm value | 20~300V, 0 means alarm closed. | Alarm action: over the setting value.<br>Alarm reset: delay 5s after the alarm condition is eliminated. |
| Temperature high level alarm value | 30--120, 0 means alarm closed. | Alarm action: over the setting value.<br>Alarm reset: delay 5s after the alarm condition is eliminated. |
| Leakage current high level alarm value | 0.1—1A, 0 means alarm closed. | Alarm action: over the setting value.<br>Alarm reset: delay 5s after the alarm condition is eliminated. |
| Null-Earth voltage high level alarm value | 2—10V, 0 means alarm closed. | Alarm action: over the setting value.<br>Alarm reset: delay 5s after the alarm condition is eliminated. |

## 5.7 Outgoing Circuit Value Programming

Outgoing circuit alarm setting as picture 5.12

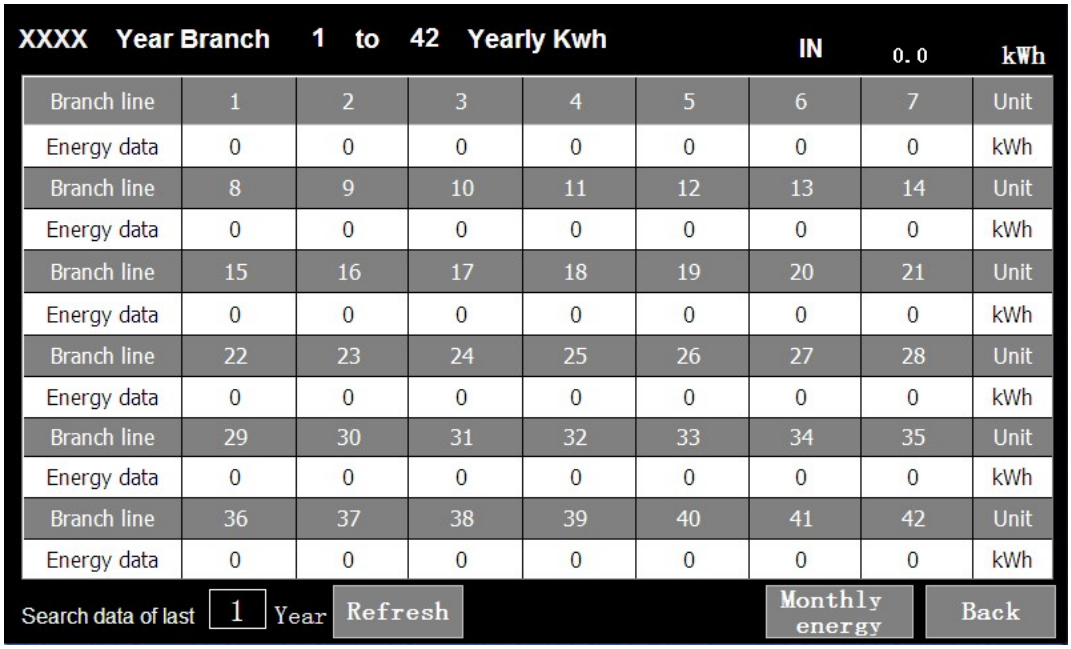



Picture 5.12

| Items | Parameter | Definition |
|---|---|---|
| Current low-low level alarm value | 5.0～250.0A，0 means alarm closed. | Alarm action: over 0 and smaller than setting value.<br>Alarm reset: delay 5s after the alarm condition is eliminated. |
| Current low level alarm value | 5.0～250.0A，0 means alarm closed. | Alarm action: over the low-low level alarm value and smaller than setting value.<br>Alarm reset: delay 5s after the alarm condition is eliminated. |
| Current high level alarm value | 5.0～250.0A，0 means alarm closed. | Alarm action: over the setting value and smaller than high-high level alarm value.<br>Alarm reset: delay 5s after the alarm condition is eliminated. |
| Current high-high level alarm value | 5.0～250.0A，0 means alarm closed. | Alarm action: over the setting value.<br>Alarm reset: delay 5s after the alarm condition is eliminated. |

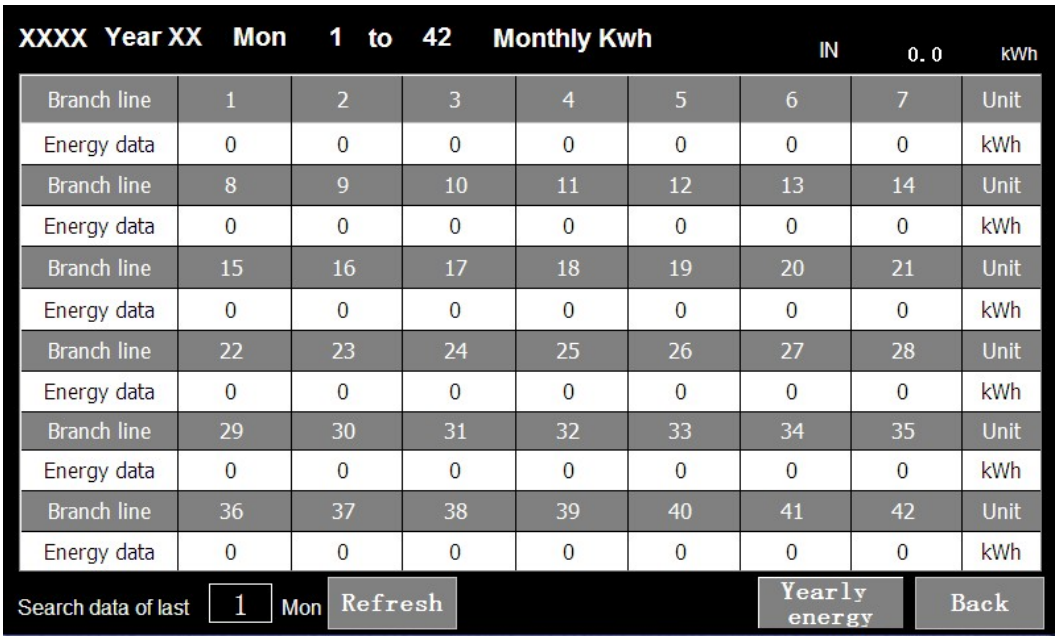
## 5.8 History Electrical Degree

Display historical Year electrical degree value, as picture 5.13




Picture 5.13

Display historical Month electrical degree value, as picture 5.14

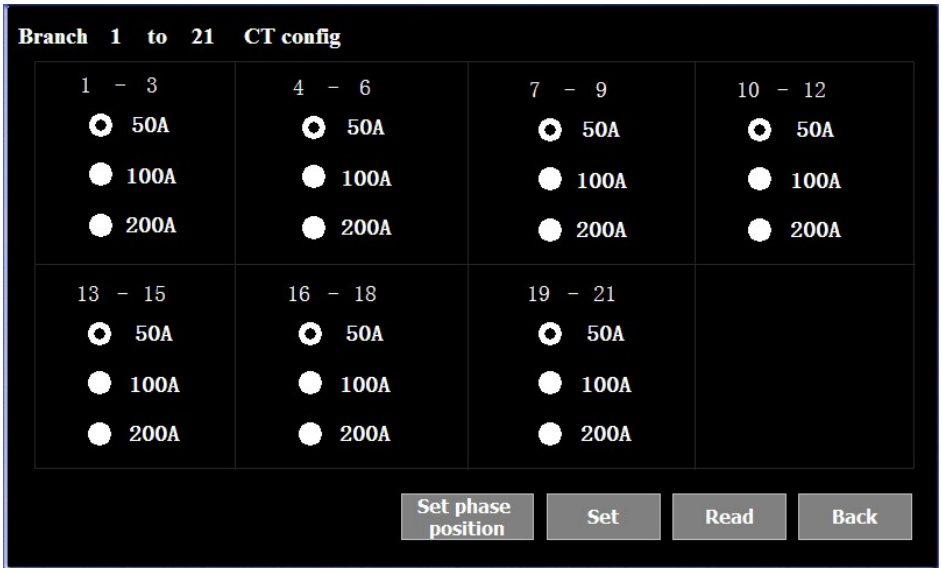



Picture 5.14

## 5.9 CT Setting

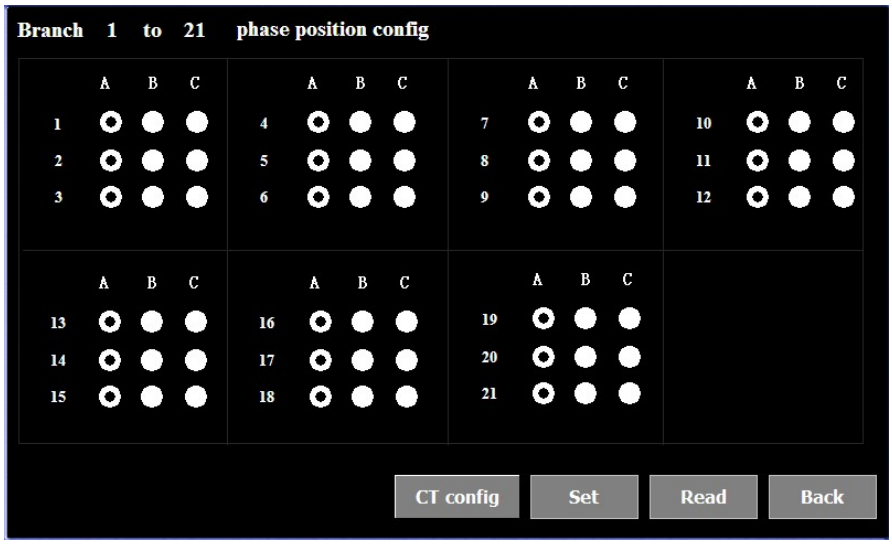
| Notice |
| --- |
| CT specification will be effective after be revised need power ON again, revise phase position configuration no need re-power on, please make sure connection sequence and configuration correspondence |

Display CT specification as picture 5.15




Picture 5.15

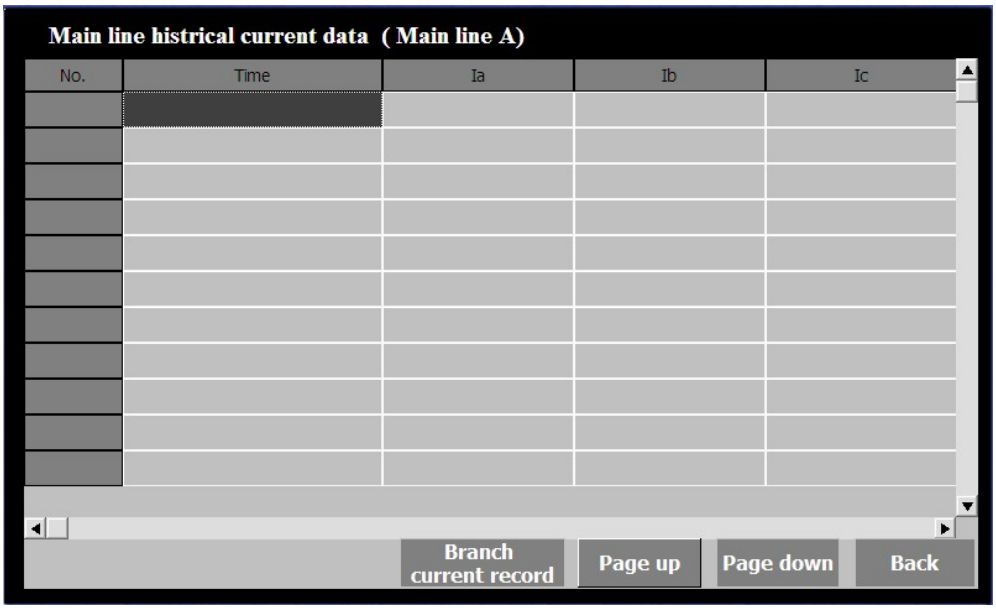
Phase position configuration interface




Picture 5.16

## 5.10 Data Record

Record incoming line current value, each 20 minutes record one time, as picture 5.17




Picture 5.17

# 6. Maintenance and Trouble Shooting

| Possible Question | Possible Reason | Solutions |
|---|---|---|
| Device no display after add control source | The power did not add to the device | Check the power supply terminals on device to make sure whether add correct operating voltage<br>Check the source control fuse not be burned |
| Measuring value not correct or non-conformance with expect value | Voltage measurement not correct | Check measuring voltage whether match with rated parameter<br>Check connection wiring |
| | Current measurement not correct | Check measuring current whether match with rated parameter<br>Check CT parameter<br>Check connection wiring |
| | Power measurement not correct | Check voltage / current phase sequence<br>Check current dotted terminal<br>Check CT phase sequence |
| Outgoing Circuit Switch Status no operation | Status module communication stop | Check status module communication indicate light<br>Check status module communication connection wiring |
| | Switch status operation voltage incorrect | Check outside node types whether match with device rated parameter<br>Check outside connection wiring |
| Main module can not connect with Host computer | Communication address incorrect | Check device communication address |
| | Communication baud rate incorrect | Check device communication baud rate |
| | Communication interference | Check communication shield layer |
| | Communication stop | Check communication cable |
| | System configuration not match with main module | Check system configuration<br>Check main module dial switch |