

**PilotSPM206 (54 circuits)
Branch Circuit Power Meter**

**Installation & Operation Manual
V2.0**

ZHUHAI PILOT TECHNOLOGY CO., LTD

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, burning 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 will cause damage to the equipment or injuries to people

Content

1. PRODUCT INTRODUCTION	1
1.1 Overview	1
1.2 Product Features:	1
1.3 HMI Human-Computer Interface	1
1.4 Product Composition	1
2. PRODUCT PERFORMANCE AND FUNCTION.....	3
2.1 Product Model	3
2.2 Product Function.....	4
2.3 Technical Specification	5
2.4 EMC Properties	6
2.5 Working Environment	6
3. DIMENSION AND INSTALLATION.....	7
3.1 Main module	7
3.2 DI Module.....	8
3.3 Branch circuit CT group-60A.....	9
3.4 Branch circuit CT -100A.....	9
3.5 Branch circuit CT -200A.....	10
3.6 Branch circuit CT -400A.....	10
3.7 Branch circuit CT -600A.....	11
3.8 Main Incoming Circuit Leakage Current Transformer	11
3.9 Display Module -HMI	12
3.10 DC 24V relay	13
3.11 Temperature Sensor	13
4. CONNECTION WIRING	14
4.1 Main Module Terminals	14
4.2 DI Module Terminals	15
4.3 HMI Power Connection	16
4.4 Main Incoming Circuit Wiring.....	17
4.5 Branch Outgoing Circuit Wiring.....	18
4.6 Wiring for One Main Incoming Circuit System	19
4.7 Wiring for Two Main Incoming Circuit System	20
4.8 Wiring for One-main & One -back up Incoming Circuit System	21
4.9 Multi Main Modules Address Setting.....	22
4.10. Wiring for Branch circuit Switch Faulty Alarm (SD)	23
5. DISPLAY AND OPERATION	25
5.1 System Configuration	25
5.1.1 <i>One Main Incoming Circuit Configuration</i>	25
5.1.2 <i>Two Main Incoming Circuit Configuration</i>	25
5.1.3 <i>One Main & One Backup Incoming Circuit Configuration</i>	26
5.1.4 <i>Clear Energy</i>	26
5.1.5 <i>Clear Max. Data</i>	26
5.1.6 <i>Time Synchronization</i>	26
5.1.7 <i>Function Config</i>	27

5.1.8 Setting	27
5.1.9 LCD Back Light Setting.....	27
5.1.10 Password Input.....	27
5.1.11 Password Modification.....	27
5.2 Data Display.....	28
5.2.1 Real Time Data Display	28
5.2.2 DI status display	28
5.2.3 Alarm display.....	29
5.2.4 Communication Status Indicate	29
5.2.5 Key Operation.....	29
5.3 Main Incoming Circuit Data.....	29
5.4 Branch Outgoing Circuit Data.....	30
5.5 Real-time Alarm Record	31
5.6 Main Incoming Circuit Parameter Config	32
5.7 Branch Outgoing Circuit Parameter Config	35
5.8 History Energy Record	36
5.9 Branch Circuit CT Setting.....	37
5.10 Branch Circuit Mark.....	38
6. MAINTAIN AND TROUBLE SHOOTING	39

1. Product Introduction

1.1 Overview

PilotSPM206 Branch Circuit Power Meter is designed for monitoring AC power supply distribution cabinet in data center, which can monitor parameters of main incoming circuit and branch outgoing circuit, DI status, give 2 levels of alarm for voltage and current. PilotSPM206 provides the 7 inch HMI for local display. Users can choose up to 216 branch circuit monitoring. This PilotSPM206 also provides RS485 communication port which can be easily connected with other 3rd party systems.

1.2 Product Features:

- Modular design: main module, CT module and DI module are independent, meeting feeder requirements for different circuits.
- 7-inch HMI, high visibility and operability.
- Each DI module has 54 channels of DI (dry contact) for monitoring branch circuit breaker on-off status.
- Measure main incoming circuit neutral line current.
- Measure main incoming circuit leakage current.
- Measure neutral-earth voltage (Open)
- Measure the cabinet temperature.
- Two levels alarm, output alarm signal by internal relay and recording over 5000pcs of alarm information.
- Measure 2 loops incoming energy and each outgoing circuit energy
- Measure voltage harmonic and current harmonic
- Class 0.2 CT, making sure the measurement accuracy.
- RS485 port, Modbus-RTU protocol

1.3 HMI Human-Computer Interface

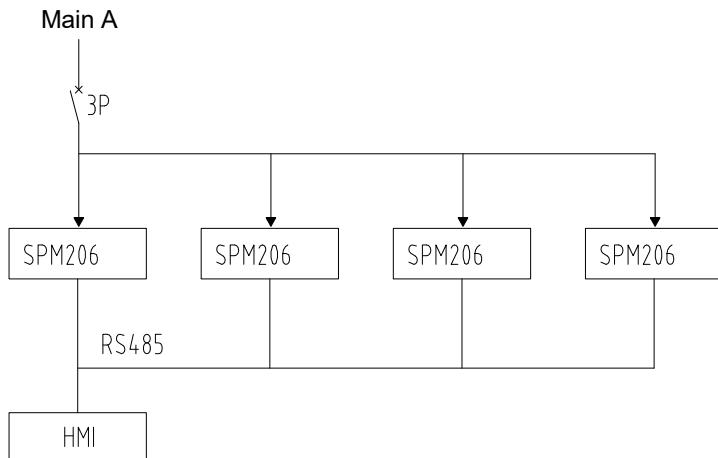
PilotSPM206 branch circuit power meter comes with one 7 inch touch screen HMI for local display, provides system chart display, with best visuality and operability.

1.4 Product Composition

The PilotSPM206 consist of Main module, Digital Input module, HMI module, CT module. Users need to choose the modules according to different application. There are two main typical application as below:

■ One Main Incoming Circuit:

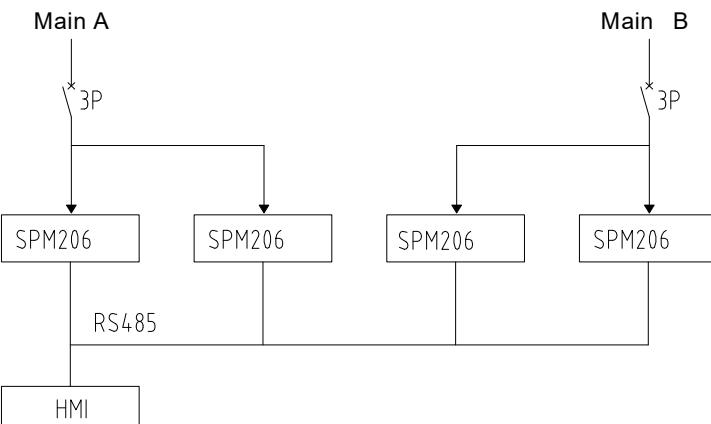
One main circuit



Remark:

1. In one main circuit wiring system, each PilotSPM206 measure max. 54 branch circuits.
2. One main circuit max. has 216 branch circuits.
3. One HMI max. connect 4pcs of PilotSPM206 main modules to monitor 168 branch circuits.

■ Two Main Incoming Circuits:



Remark:

1. In two main circuit wiring system, each PilotSPM206 measure max. 54 branch circuits.
2. Each main circuit max. has 108 branch circuits.
3. One HMI max. connect 4pcs of PilotSPM206 main modules to monitor 168 branch circuits.

2. Product Performance and Function

2.1 Product Model

Name	PilotSPM206 Branch Circuit Power Meter	
Model	PilotSPM206- □ - □ - □ ① ② ③ ① Branch num. 54	
	54- Monitoring 54 branch circuits	
	② Branch current C1, C2, C3, C4, C5 C1- Branch Circuit 21-loop CT strip, Rated Current: 50A C2- Branch Circuit separate CT, Rated Current 100A C3- Branch Circuit separate CT, Rated Current 200A C4- Branch Circuit separate CT, Rated Current 400A C5- Branch Circuit separate CT, Rated Current 600A	
	③ Optional function T, L, TL T- One loop temperature measuring, PT100 L- One leakage current measuring, rated current 1A (Primary) TL- One loop temperature + One leakage current measuring	

List of modules

No.	Des.	Model	Remark
1	Display module	PMAC201V6	HMI - 7" touch screen LCD
2	Main module	PilotSPM206—x-x-x	
3	DI module	PilotSPM206K-54 (dry contact)	Branch circuit breaker should have OF point. Dry contact—Monitor the branches' Switch auxiliary contact, constant voltage. 1 is ON, 0 is OFF.
4	DI module	PilotSPM206K-54 (AC 220V)	Get power supply from breaker. When voltage < 40% is 0 (OFF). When voltage > 70% is 1 (ON).
5	60A branch circuit CT	LACT-60M2	It has 3 CTs in one group, for 3 circuits
6	100A branch circuit CT	LACT-100C2	1 CT for one circuit
7	200A branch circuit CT	LACT-200C2	1 CT for one circuit
8	400A branch circuit CT	LACT-400C2	1 CT for one circuit
9	600A branch circuit CT	LACT-600C2	1 CT for one circuit
10	250A main circuit leakage CT	PMAC503L-250	Primary 1A
11	Temperature sensor	MS6-PT100B-3000	
12	24VDC relay	MY2N-GS	Switch HMI main /back up power supply Select when there has 2 main input circuit.

2.2 Product Function

Function	Illustration
Main Incoming Circuit	
Neutral line current	Monitoring main incoming circuit neutral line current
Leakage current	Monitoring main incoming circuit leakage current, Rated 1A (primary)
Temperature	Monitoring one loop temperature, range: 0—120 centi-degree. Measuring Isolation Transformer or cabinet temperature.
Digital input	4 DI (dry contact) for monitoring main circuit breaker or lighting protection switch.
Electrical parameter measuring	Monitoring 3 phase voltage, 3 phase current, 3 phase max. current, current unbalance, 3 phase active power, total active power, total power factor, frequency, total active energy
Main incoming circuit demand	Monitoring 3 phase demand and max. demand (for 3 phase current, 3 phase active power and total active power)
Main incoming circuit harmonic	Monitoring voltage THD and current THD (2-31 st)
Main incoming circuit overload alarm	2 levels (hi-limit and hi-hi-limit) alarm setting for the main incoming high current
Main incoming circuit underload alarm	2 levels (lo-limit and lo-lo-limit) alarm setting for the main incoming low current
Main incoming circuit current unbalance alarm	Alarm setting for the high current unbalance.
Main incoming circuit over voltage alarm	Alarm setting for the high voltage.
Main incoming circuit under voltage alarm	Alarm setting for the low voltage
Phase loss alarm of main incoming circuit	When any one of the 3 phase voltage value is 0 (Under the threshold of voltage measurement), and at the same time, at lease there is one phase voltage is higher than 20V, then it will alarm (No require to set value)
Main incoming neutral line over current alarm	Alarm setting for high neutral line current
Main incoming leakage current alarm	Alarm setting for high leakage current
Temperature alarm	Alarm setting for high temperature
Branch Outgoing Circuit	
Branch outgoing circuit monitoring	One main module monitor 1~ 42 branch circuit
Branch circuit digital input	Monitoring branch circuit breaker ON/OFF status

Branch circuit electrical parameter measuring	Monitoring current, max. current, active power, reactive power, power factor, active energy, current THD
Branch circuit demand	Monitoring demand and max. demand (for current and active power)
Branch circuit overload alarm	2 levels (hi-limit and hi-hi-limit) alarm setting for the branch circuit high current
Branch circuit underload alarm	2 levels (lo-limit and lo-lo-limit) alarm setting for the branch circuit low current
Branch circuit digital input status change alarm	Alarm setting for branch circuit DI status change from ON to OFF
Others	
Display	7 inch touch screen HMI, resolution 800x480
Communication port	RS485, Modbus-RTU Protocol
Relay output	2 relay alarm output
Event record function	HMI can record more than 5000 pcs of alarm events
Setting function	Setting parameters by HMI, such as: CT Ratio, Alarm value
Running indication	The main module and DI module have running indicate LED lights
DI status indication	The digital input has status indicate LED lights
Branch circuit phase sequence configurable	Branch outgoing phase sequence can be configured by HMI or by RS485 communication
Active energy pulse output	Set pulse output object to active energy of main circuit or branch circuit.
Data record	Record history energy data

2.3 Technical Specification

Name	Illustration
Power Supply	AC 220V, Range: 85 ~264Vdc
MTBF	No less than 50000 hours
Design service life	10 Years
Rated voltage	AC 220V phase voltage, Range: 10%~120% rated value, Accuracy: 0.5%
Rated current of main incoming circuit	5A, Range: 1%~120% rated value, Accuracy: 0.5%
Rated current of branch outgoing circuit	50A, Range: 1%~120% rated value, Accuracy: 0.5%
Demand measuring	Demand interval: 15 minutes, sub-interval: 1 minute
Rated frequency	50Hz, Range: 45~60Hz, ±0.01Hz
Power factor	-1.000 ~+1.000, Accuracy: 1%

Active power and kWh	Accuracy: 1%
Leakage current	1A ac, Range: 10%--120% rated, accuracy: 0.5%
Neutral line voltage (Open)	5V ac, Range: 10%--200% rated, accuracy: 0.5%
Communication port	RS485
Digital input	Main circuit: dry contact (no require external power) Branch circuit: option 1: wet contact, 220Vac, 70%--120% rated value option 2: dry contact
Relay output	Capacity: AC 250V/5A or DC 30V/5A

2.4 EMC Properties

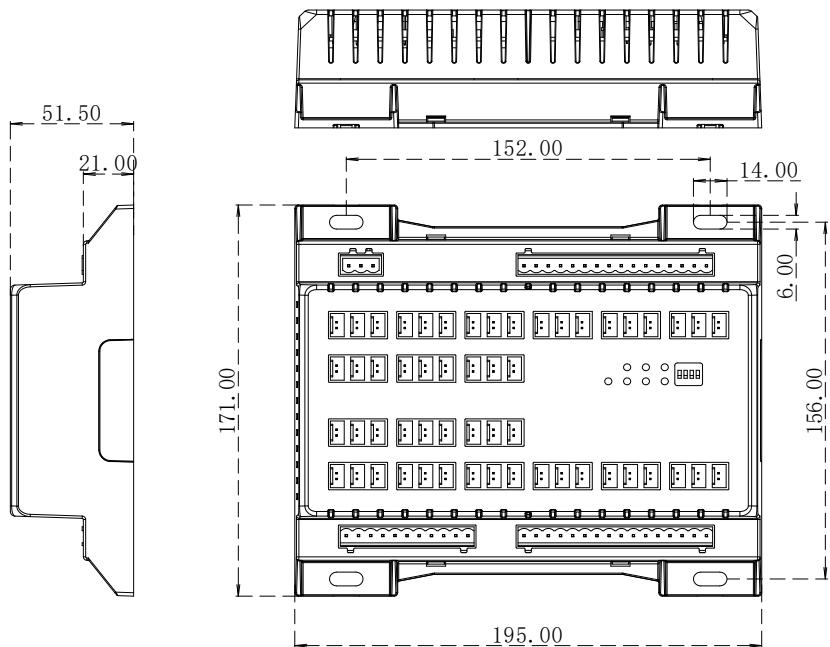
Items	Technical Index	Standard
Electrostatic Discharge Immunity Test	Level 3	IEC61000-4-2
Radiated Immunity Test	Level 3	IEC61000-4-3
Electrical Fast Transient/Burst Immunity Test	Level 3	IEC61000-4-4
Surge Immunity Test (1.2/50μs)	Level 3	IEC61000-4-5
Power Frequency withstand voltage	Rated Insulation Voltage ≤ 60V, Test Voltage 1000V Rated Insulation Voltage ≤ 300V, Test Voltage 2000V	IEC 62052-11: 2003

2.5 Working Environment

Item	Parameter
Working site	Indoor
Working temperature	-10°C~55°C
Storage temperature	-25°C~70°C
Humidity	5%~95% RH, non-condensing
IP index	IP20, HMI (front panel) IP65
Insulation resistance	No less than 100MΩ, IEC62052-11

3.Dimension and Installation

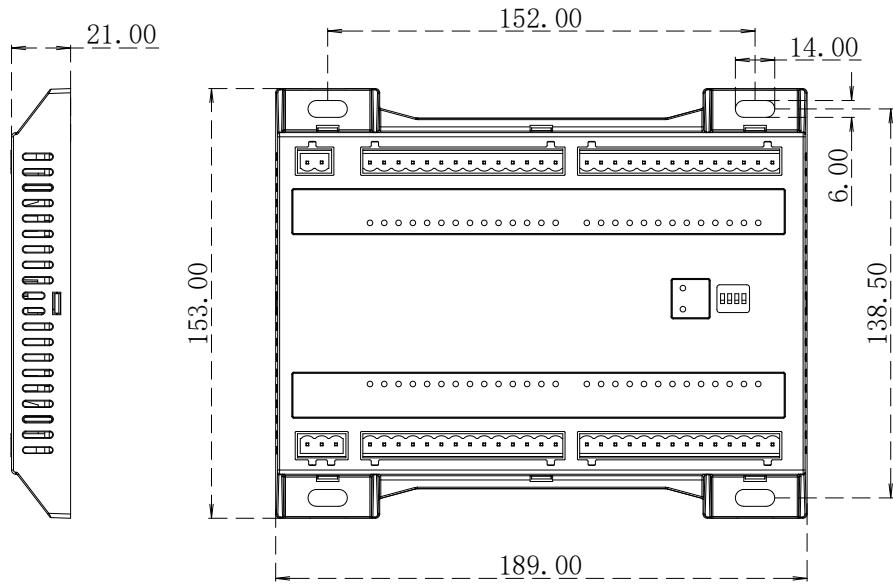
3.1 Main module



Picture 3.1 Main Module

[Note]: Use 4 screws to fix the main module, unit: mm

3.2 DI Module



Picture 3.2 DI Module

[Note]:

1. Use 4 screws to fix the main module
2. Running indication LED light:

LED flashes, means normal working and communication is also working.

LED normal ON, means normal working but communication error.

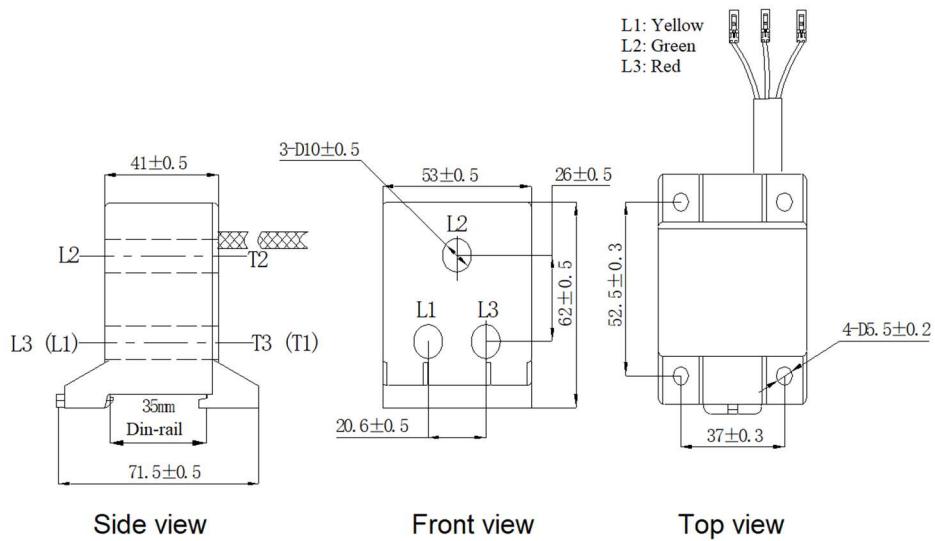
unit: mm

DI Module Address setting

One Main Module can connect one DI Module, the address of DI module setting by dial switch, setting dial switch as below:



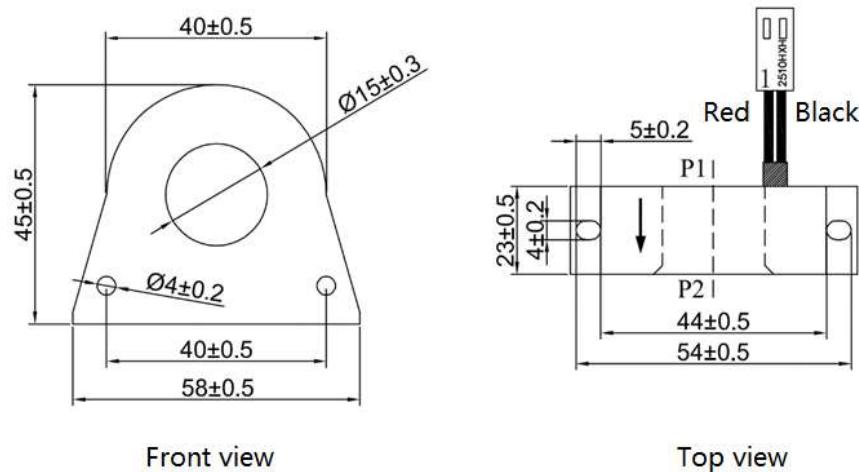
3.3 Branch circuit CT group-60A



Picture 3.3

[Note]: Model: LACT-60M2, bolted install/ Din-rail install. unit: mm

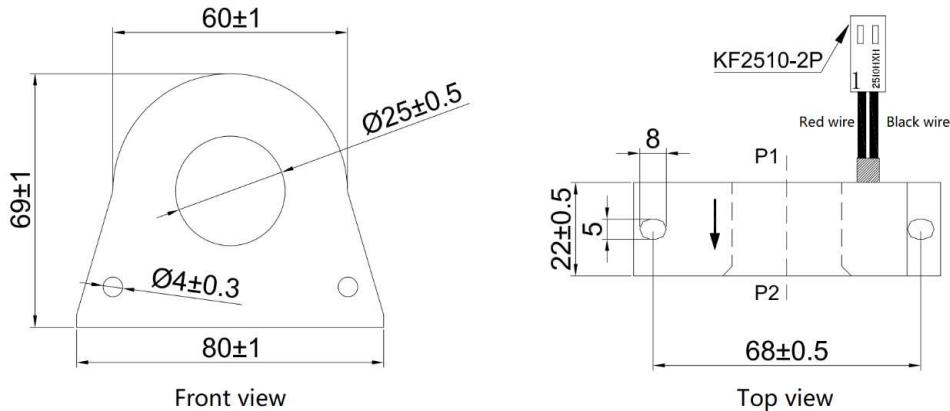
3.4 Branch circuit CT -100A



Picture 3.4

[Note]: Model: LACT-100C2, bolted install, unit: mm

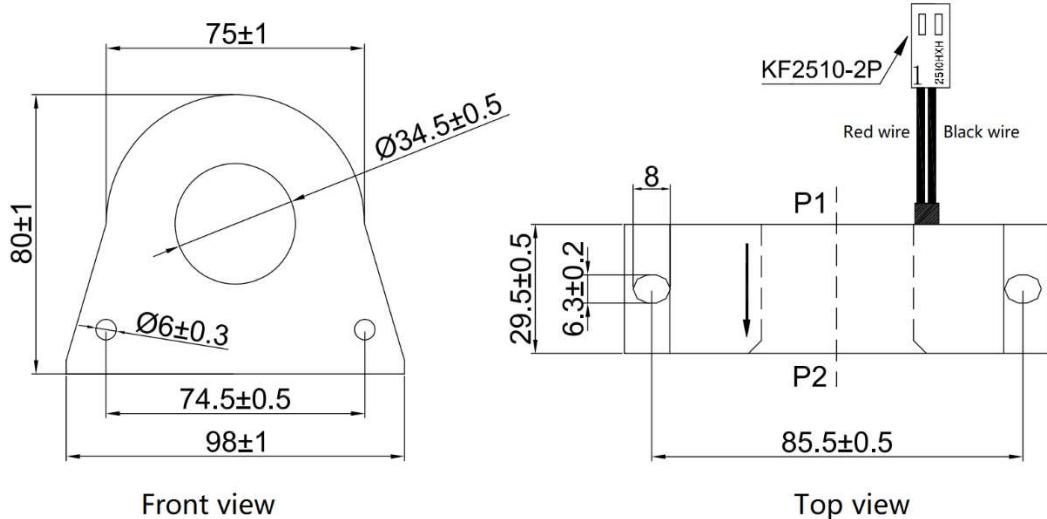
3.5 Branch circuit CT -200A



Picture 3.5

[Note]: Model: LACT-200C2, bolted install, unit: mm

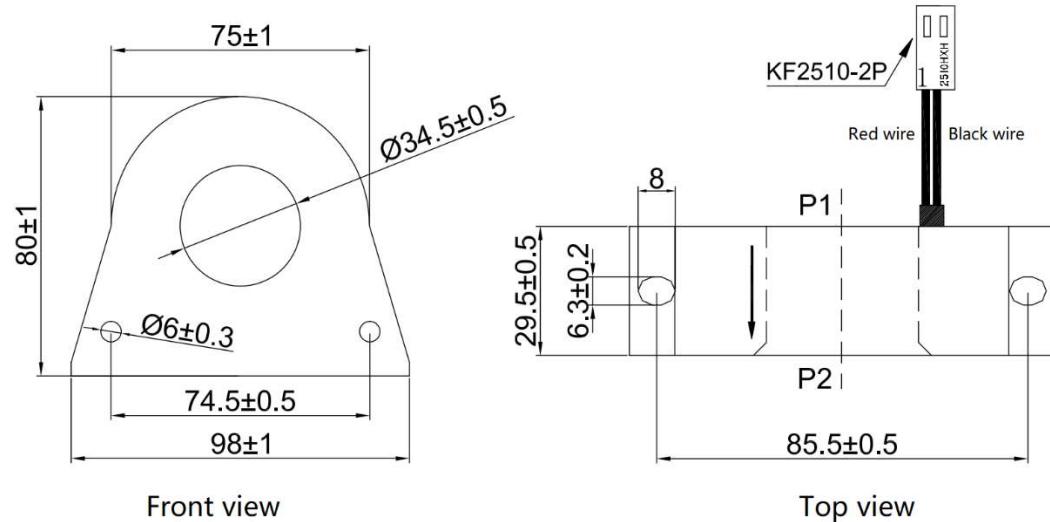
3.6 Branch circuit CT -400A



Picture 3.6

[Note]: Model: LACT-400C2, bolted install, unit: mm

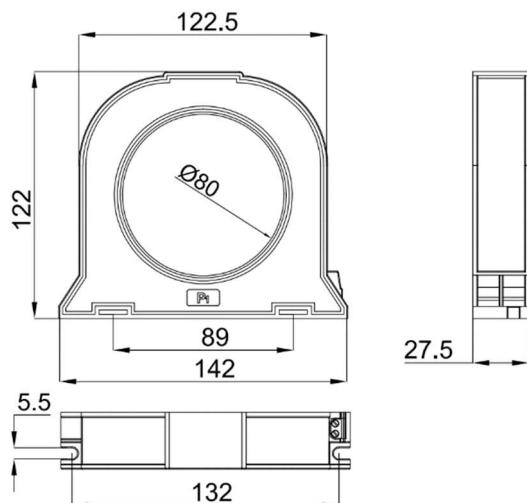
3.7 Branch circuit CT -600A



Picture 3.7

[Note]: Model: LACT-600C2, bolted install, unit: mm

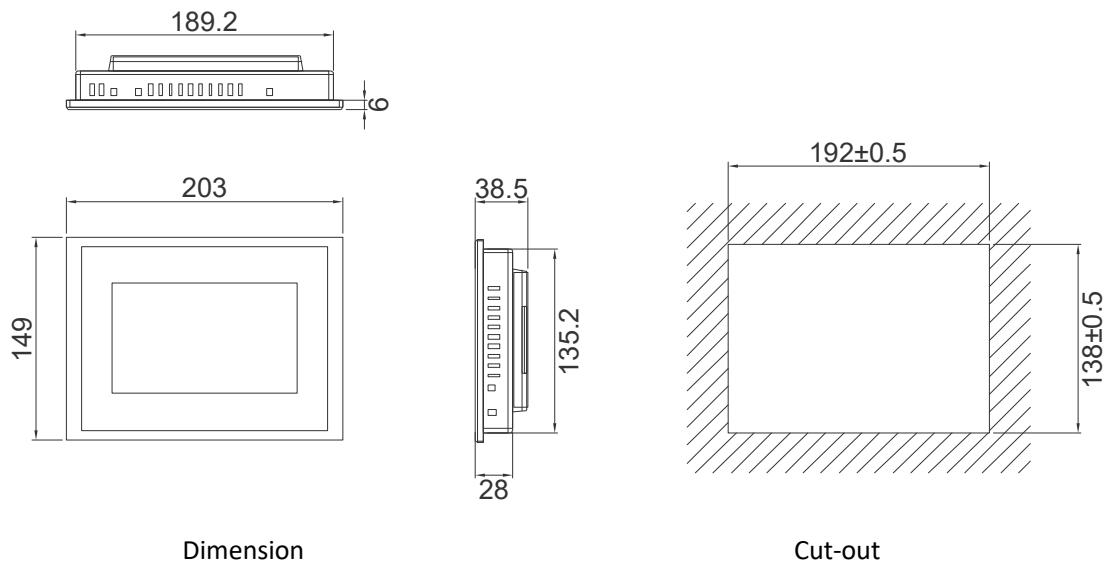
3.8 Main Incoming Circuit Leakage Current Transformer



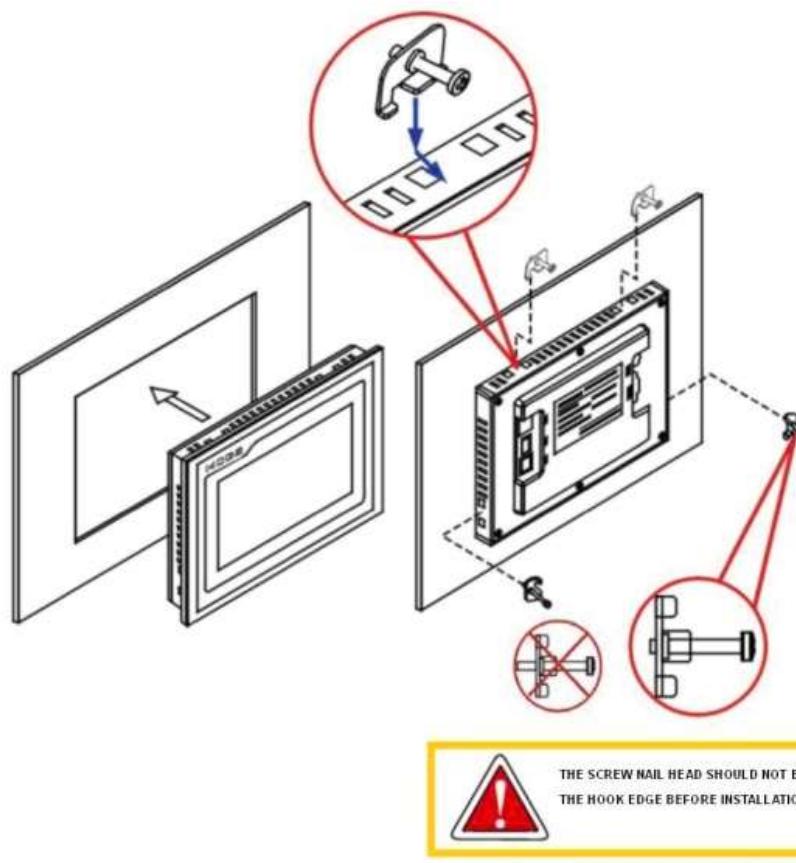
Picture 3.8 Leakage Current Transformer

[Note]: Model: PMAC503L-250A, bolted install, unit: mm

3.9 Display Module -HMI



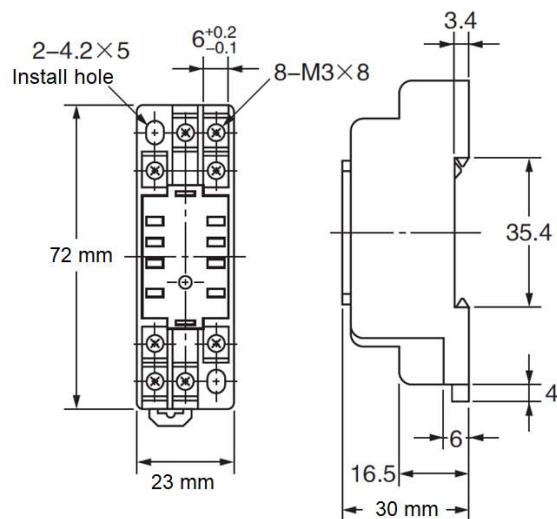
Picture 3.9 HMI



Picture 3.10 HMI Installation

[Note]: HMI Embedded panel mounting, unit: mm
HMI Embedded panel mounting, unit: mm

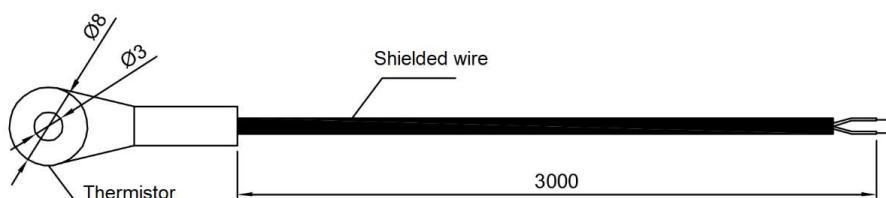
3.10 DC 24V relay



Picture 3.11 MY2N-GS

3.11 Temperature Sensor

Unit: mm



[Note]: HMI Embedded panel mounting, unit: mm

4. Connection Wiring

4.1 Main Module Terminals

No.	Mark	Instruction	No.	Mark	Instruction
1	L/+	AC220V Power supply	20	24V-	24V DC power output, power supply to DI module or HMI
2	NC		21	24V+	
3	N/-		22	SHLD	The 3 rd RS485, communication to 3 rd party system
4	VA	Main circuit voltage input	23	485C-	
5	NV		24	485C+	
6	VB		25	SHLD	
7	NC		26	485B-	The 2 nd RS485, communication to HMI
8	VC		27	485B+	
9	VN		28	SHLD	
10	IN1	Main circuit neutral line current	29	485A-	The 1 st RS485, communication to DI module
11	IN2		30	485A+	
12	IA1*	Main circuit phase A current * is the same polarity	31	S1	Digital input 1~4
13	IA2		32	S2	
14	IB1*	Main circuit phase B current * is the same polarity	33	S3	
15	IB2		34	S4	
16	IC1*	Main circuit phase C current * is the same polarity	35	DC	Digital input common terminal
17	IC2		36	NC	Null
18	I△+	Leakage current	37	RL22	Relay output 2
19	I△-		38	RL21	
			39	RL12	Relay output 1
			40	RL11	
			41	Pules-	Pulse output for kWh
			42	Pules+	
			43	VN	Neutral line voltage measurement input
			44	VG	
			45	PT-	PT100 temperature input
			46	PT+	

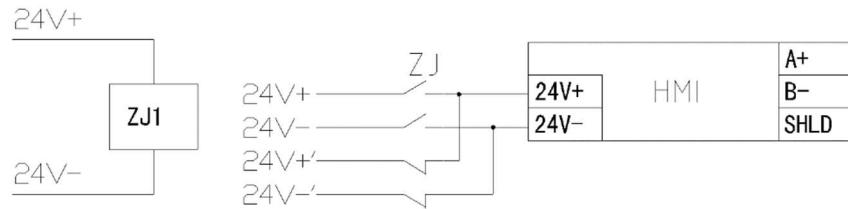
4.2 DI Module Terminals

No.	Mark	Instruction	No.	Mark	Instruction
1	24V+	24V DC power supply input, positive pole	34	S28	Digital input 28
2	24V-	24V DC power supply input, negative pole	35	S29	Digital input 29
3	SHLD	Shield	36	S30	Digital input 30
4	485-	RS485 negative	37	S31	Digital input 31
5	485+	RS485 positive	38	S32	Digital input 32
6	S1	Digital input 1	39	S33	Digital input 33
7	S2	Digital input 2	40	S34	Digital input 34
8	S3	Digital input 3	41	S35	Digital input 35
9	S4	Digital input 4	42	S36	Digital input 36
10	S5	Digital input 5	43	S37	Digital input 37
11	S6	Digital input 6	44	S38	Digital input 38
12	S7	Digital input 7	45	S39	Digital input 39
13	S8	Digital input 8	46	S40	Digital input 40
14	S9	Digital input 9	47	S41	Digital input 41
15	S10	Digital input 10	48	S42	Digital input 42
16	S11	Digital input 11	49	S43	Digital input 43
17	S12	Digital input 12	50	S44	Digital input 44
18	S13	Digital input 13	51	S45	Digital input 45
19	S14	Digital input 14	52	S46	Digital input 46
20	S15	Digital input 15	53	S47	Digital input 47
21	S16	Digital input 16	54	S48	Digital input 48
22	S17	Digital input 17	55	S49	Digital input 49
23	S18	Digital input 18	56	S50	Digital input 50
24	S19	Digital input 19	57	S51	Digital input 51
25	S20	Digital input 20	58	S52	Digital input 52
26	S21	Digital input 21	59	S53	Digital input 53
27	S22	Digital input 22	60	S54	Digital input 54
28	S23	Digital input 23	61	SG2	S22~S42 common terminal
29	S24	Digital input 24			
30	S25	Digital input 25			
31	S26	Digital input 26			
32	S27	Digital input 27			
33	SG	S1~S21 common terminal			

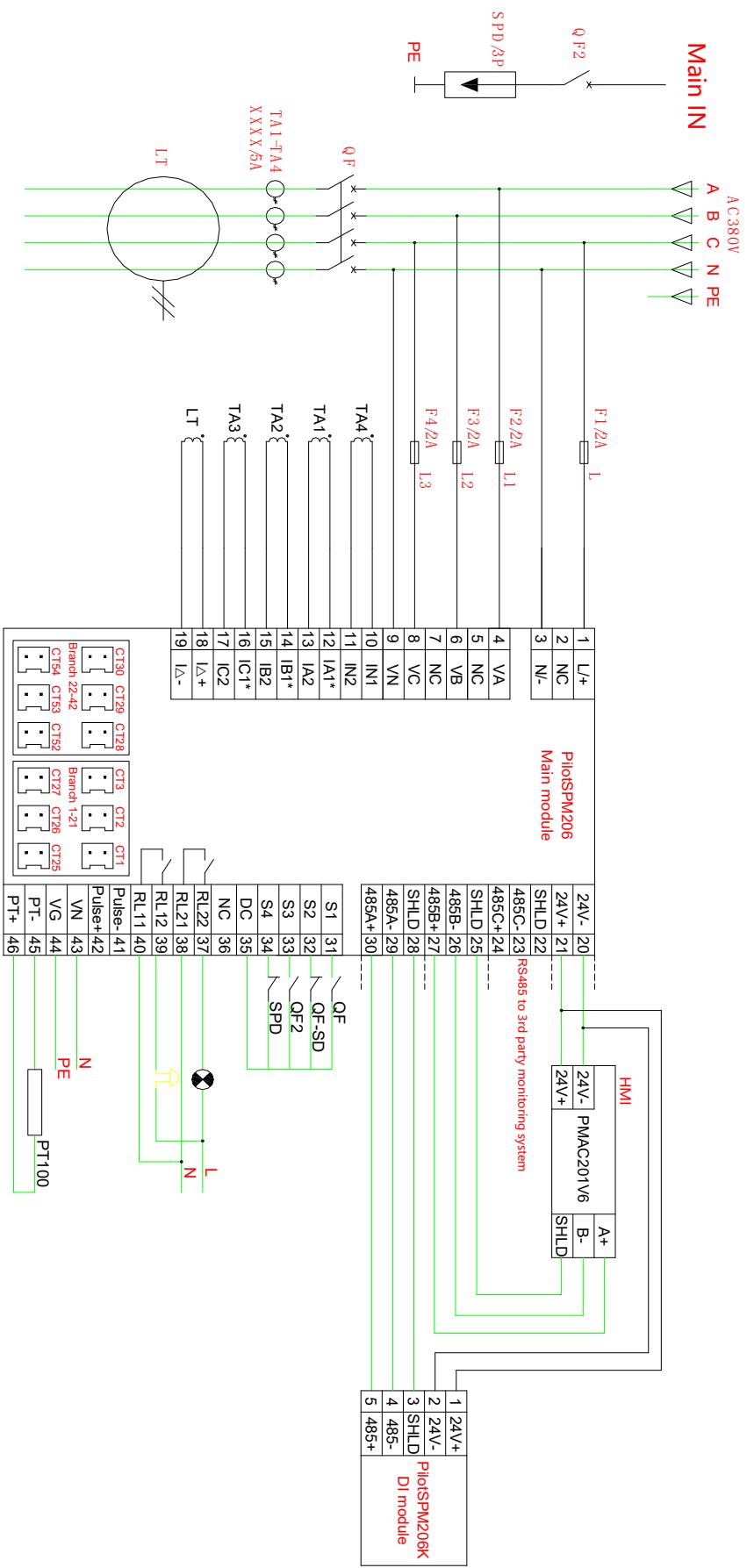
4.3 HMI Power Connection

HMI Power Supply is DC 24V, it gets power supply from Main Module 24V DC power output terminals.

If there are Two Main Incoming circuit, the HMI can get power supply by one 24V relay, as below picture:



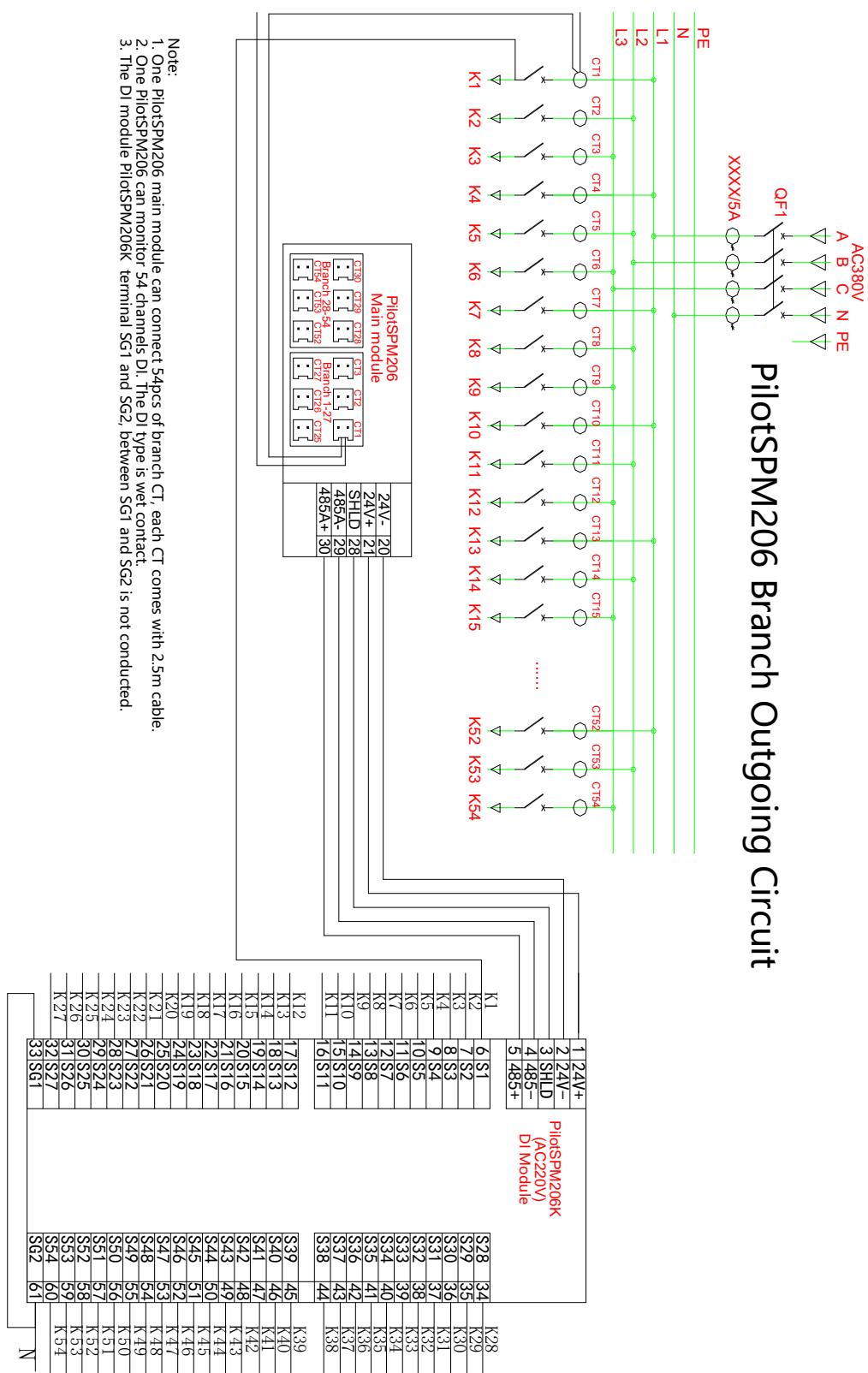
PilotSPM206 Main Incoming Circuit



Note:

1. One PilotSPM206 main module can monitor 54 branch circuit. If there are more than 54 circuit, user need to add main module. Max. monitor 168 branch circuits.
2. One PilotSPM206 has 4DI (dry contact) for monitoring the main circuit breaker status, Surge protection switch status and SPD faulty.
3. PilotSPM206 main module terminal No. 22, 23, 24 is the RS485 port for connecting 3rd party monitoring system.
4. PilotSPM206 main module working power supply is AC220V. The power supply can be taken from the upper of main circuit switch
5. NC is Null

4.5 Branch Outgoing Circuit Wiring

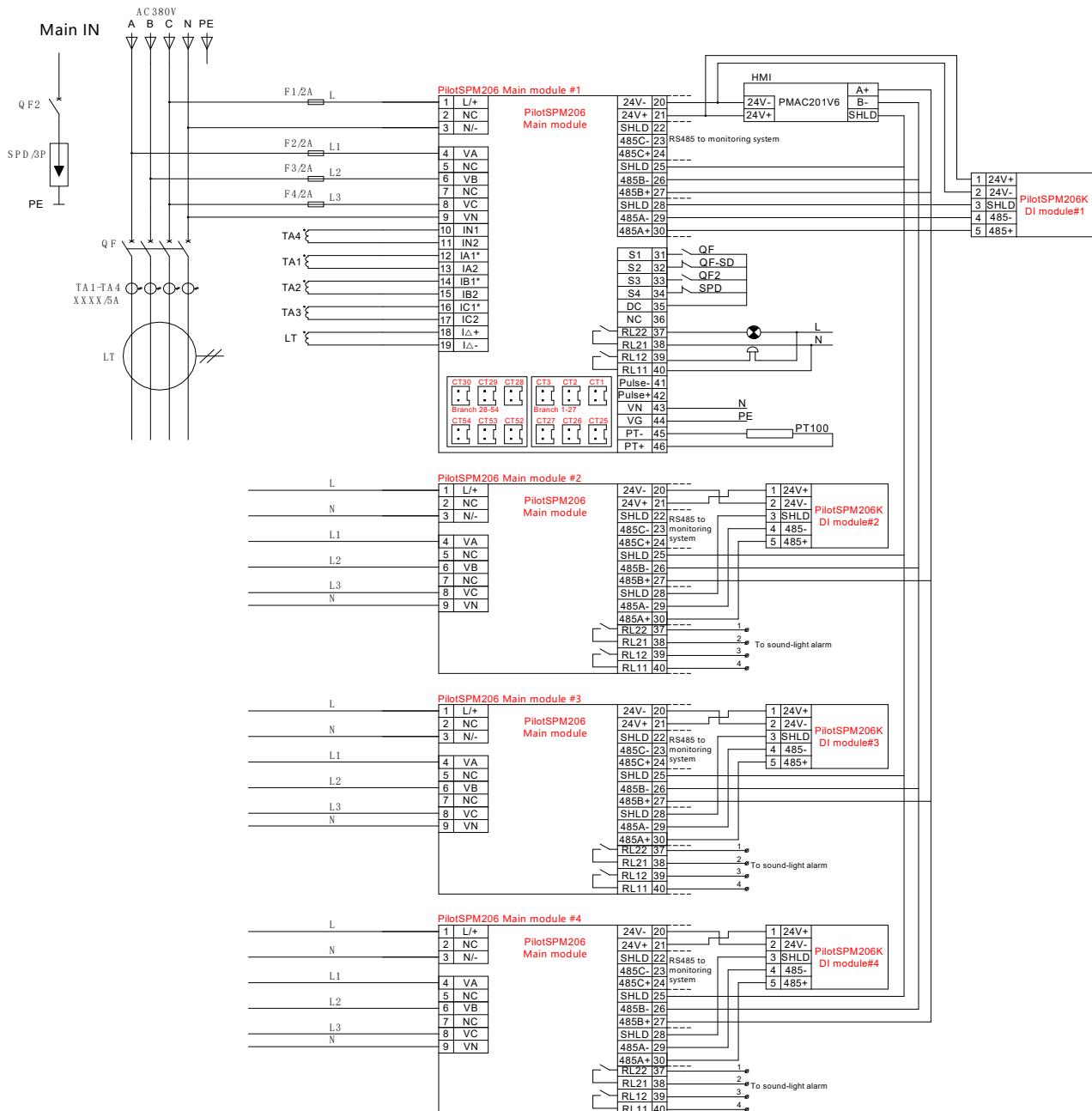


Note:
1 On

- Note:
 1. One PilotSPM206 main module can connect 54pcs of branch CT, each CT comes with 2.5m cable.
 2. One PilotSPM206 can monitor 54 channels DI. The DI type is wet contact.
 3. The DI module PilotSPM206K terminal SG1 and SG2, between SG1 and SG2 is not conducted.

4.6 Wiring for One Main Incoming Circuit System

Wiring for one main circuit system

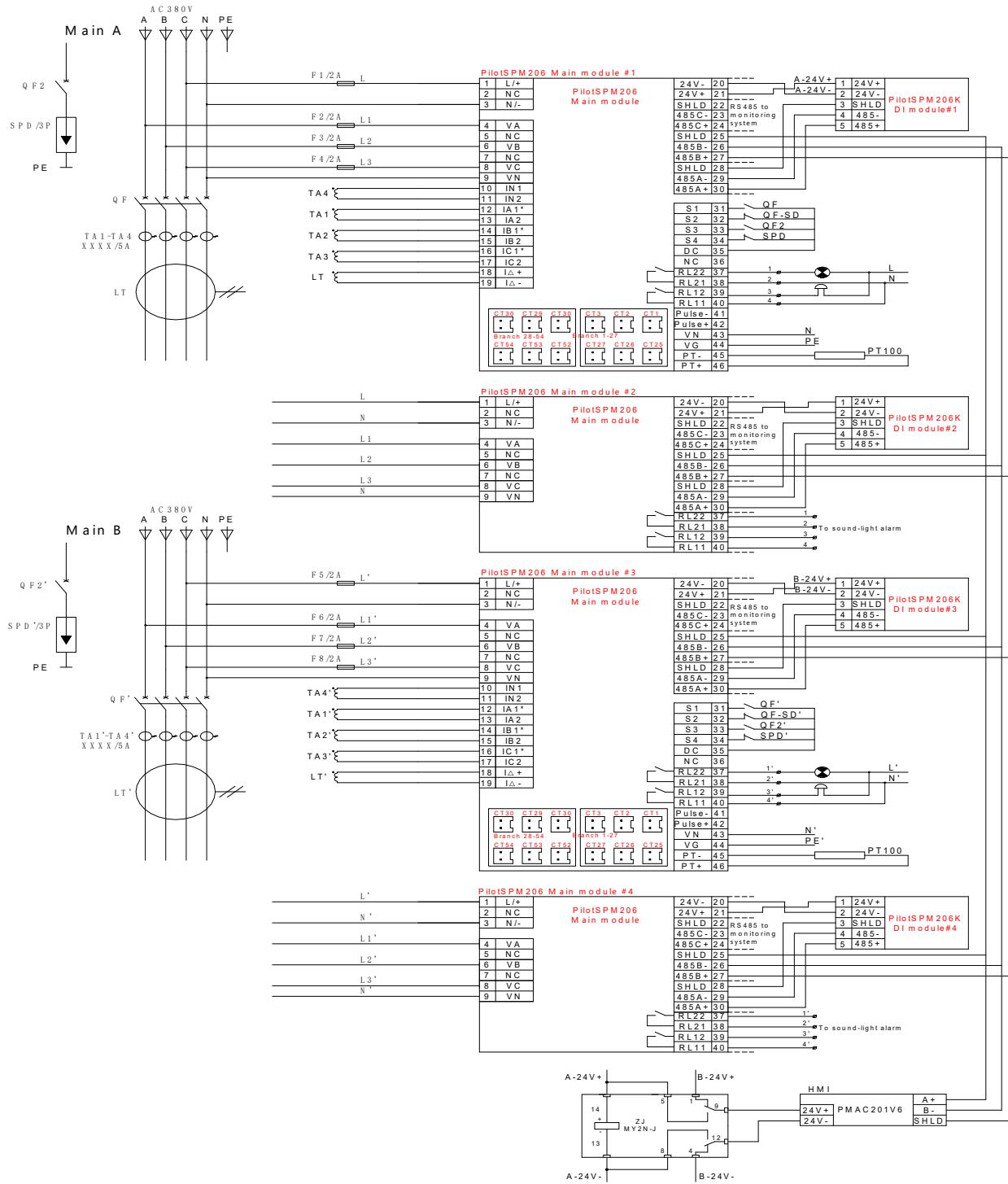


Different branch outgoing circuits configuration table:

Branch Circuit Num.	Main Module 1	Main Module 2	Main Module 3	Main Module 4	Note
54	■	□	□	□	■ Configuration needed □ Configuration no need
108	■	■	□	□	
162	■	■	■	□	
216	■	■	■	■	

4.7 Wiring for Two Main Incoming Circuit System

Wiring for two main circuits system

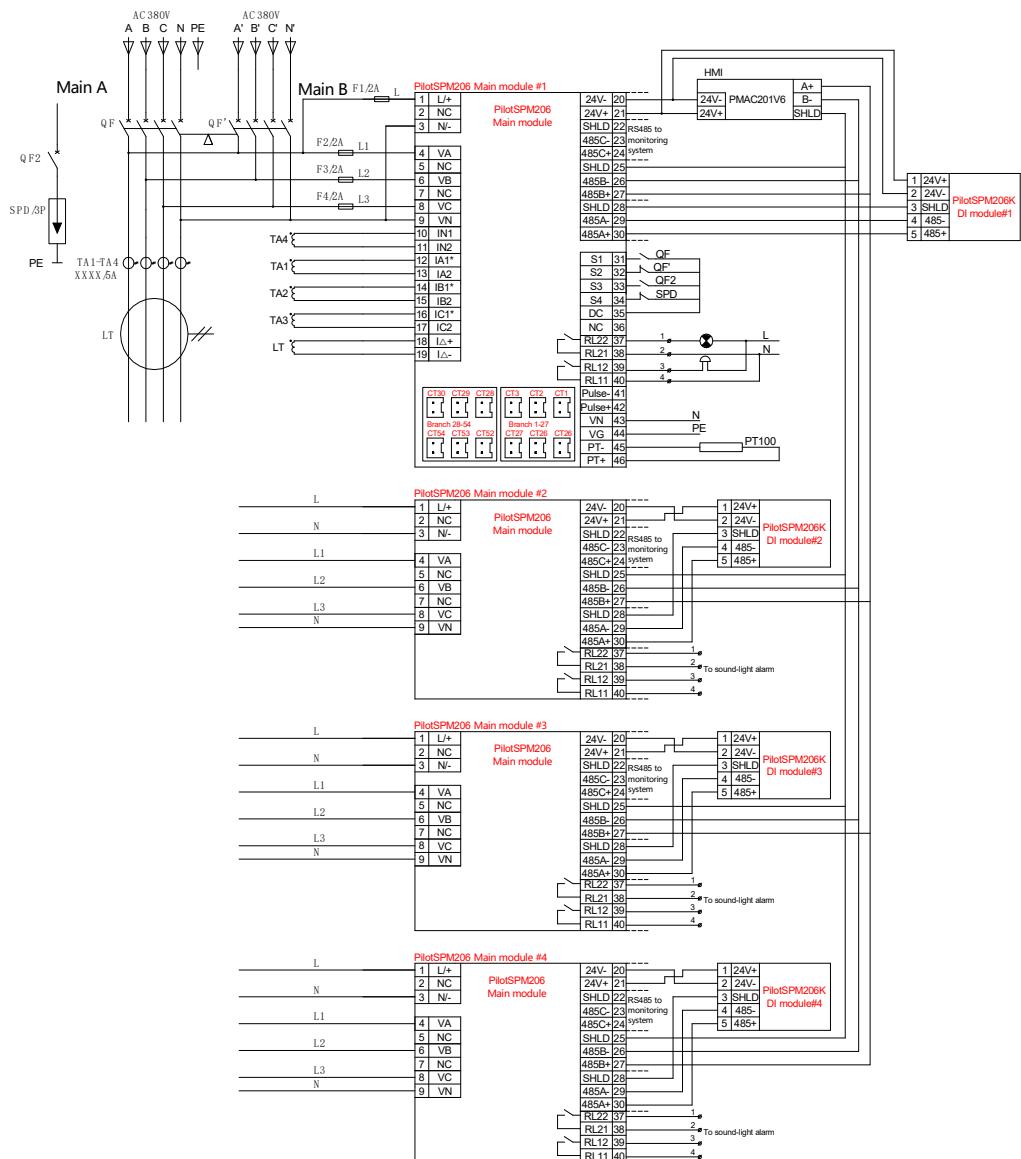


Different branch outgoing circuits configuration table:

Branch Circuit Num.	Main Module 1	Main Module 2	Main Module 3	Main Module 4	Note
54	■	□	■	□	■ Configuration needed □ Configuration no need
108	■	■	■	■	□ Configuration no need

4.8 Wiring for One-main & One -back up Incoming Circuit System

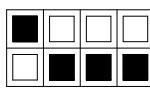
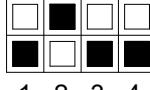
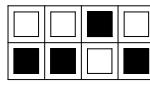
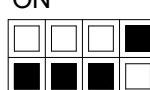
Wiring for one main + one backup system



Different branch outgoing circuits configuration table:

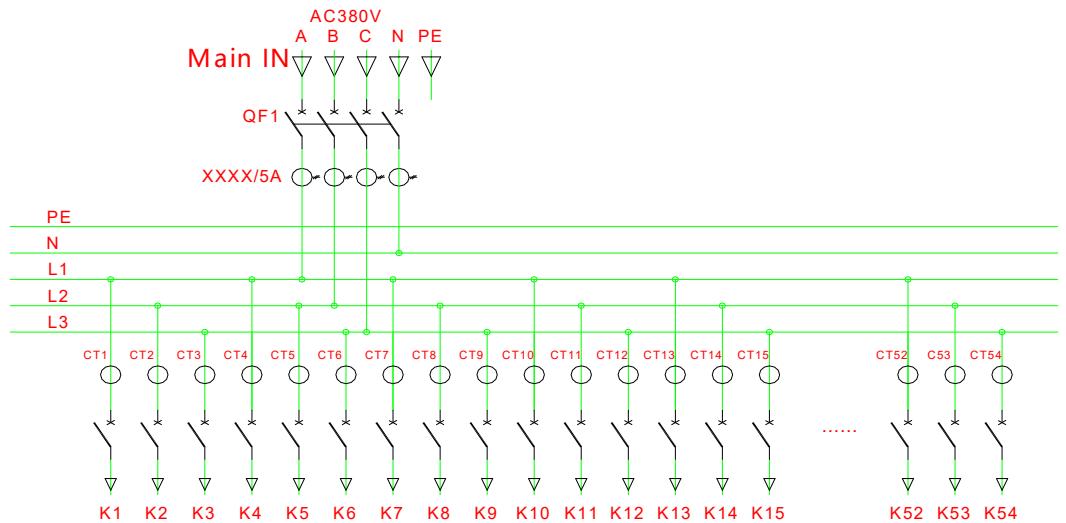
Branch Circuit Num.	Main Module 1	Main Module 2	Main Module 3	Main Module 4	Note
54	■	□	□	□	■ Configuration needed □ Configuration no need
108	■	■	□	□	
162	■	■	■	□	
216	■	■	■	■	

4.9 Multi Main Modules Address Setting

Module	Main Module Dial Switch Setting
PilotSPM206 main module 1	ON  1 2 3 4
PilotSPM206 main module 2	ON  1 2 3 4
PilotSPM206 main module 3	ON  1 2 3 4
PilotSPM206 main module 4	ON  1 2 3 4

4.10. Wiring for Branch circuit Switch Faulty Alarm (SD)

Wiring for Branch circuit switch faulty alarm (SD)



			PilotSPM206K (dry contact) DI module
From the upper DI module	1 24V+	2 24V-	
	3 SHLD	4 485-	
	4 485-	5 485+	
24V+	K1-SD	S1	K28-SD
	K2-SD	S2	S29
	K3-SD	S3	S30
	K4-SD	S4	S31
	K5-SD	S5	S32
	K6-SD	S6	S33
	K7-SD	S7	S34
	K8-SD	S8	S35
	K9-SD	S9	S36
	K10-SD	S10	S37
	K11-SD	S11	S38
			K29-SD
			K30-SD
			K31-SD
			K32-SD
			K33-SD
			K34-SD
			K35-SD
			K36-SD
			K37-SD
			K38-SD
	K12-SD	S12	S39
	K13-SD	S13	S40
	K14-SD	S14	S41
	K15-SD	S15	S42
	K16-SD	S16	S43
	K17-SD	S17	S44
	K18-SD	S18	S45
	K19-SD	S19	S46
	K20-SD	S20	S47
	K21-SD	S21	S48
	K22-SD	S22	S49
	K23-SD	S23	S50
	K24-SD	S24	S51
	K25-SD	S25	S52
	K26-SD	S26	S53
	K27-SD	S27	S54
		S28	S55
		S29	S56
		S30	S57
		S31	S58
		S32	S59
		S33	S60
			S61

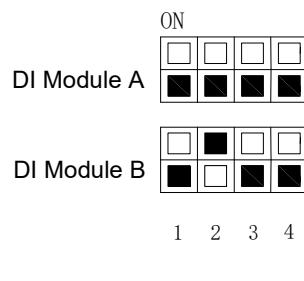
Note:

- Note:

 1. K1-SD to K54-SD is the branch circuit switch faulty status.
 2. One PilotSPM206K can monitor 54 branch switch faulty status.
 3. Between SG1 and SG2, it is not conducted.

Note: 1.K1-SD to Kx-SD are the alarm output signal of branch circuit.

Address set of DI module:



Note:

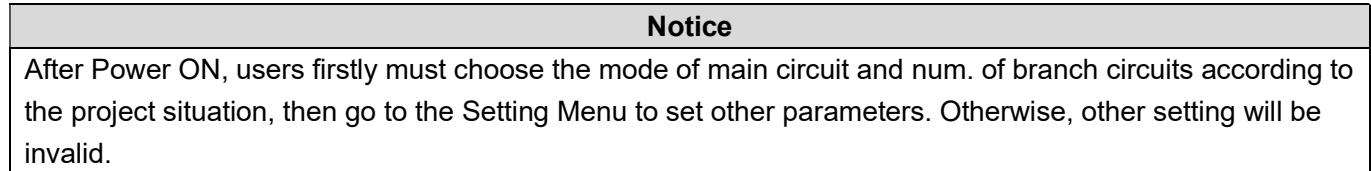
Module A test the OF signal of branch circuit switch.

Module B test the SD signal of branch circuit switch faulty

5. Display and Operation

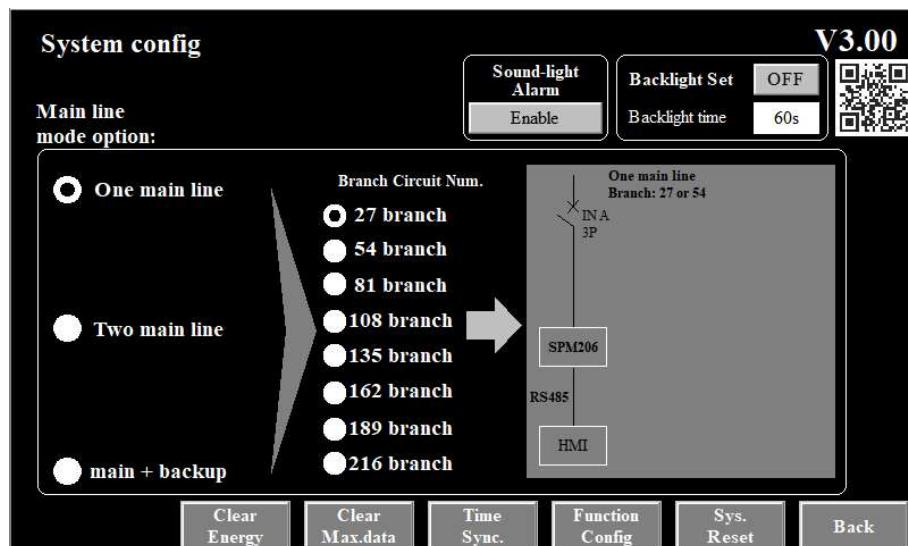
5.1 System Configuration

After Power On, HMI displays the real time data, under real time data interface, press “System Config” button to enter into system configuration interface



5.1.1 One Main Incoming Circuit Configuration

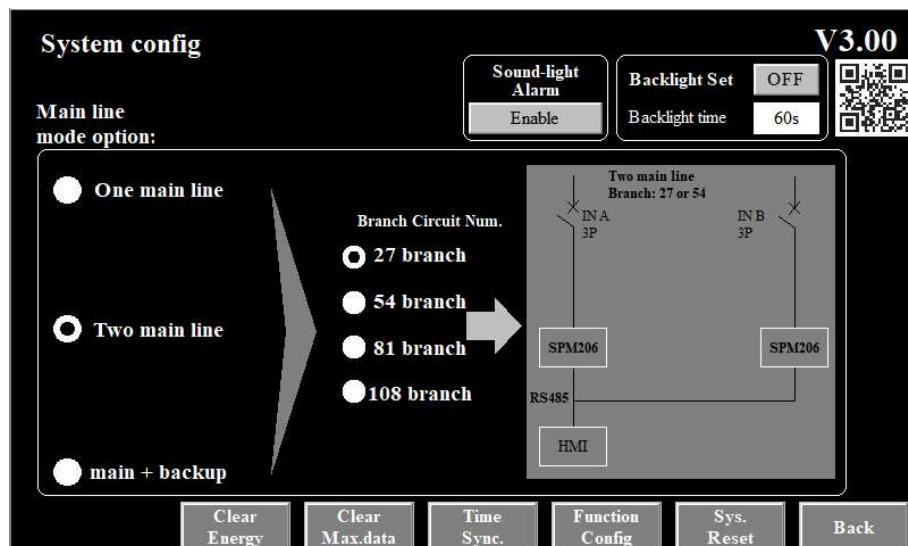
Config to “One main line” mode, as picture 5.1



picture 5.1

5.1.2 Two Main Incoming Circuit Configuration

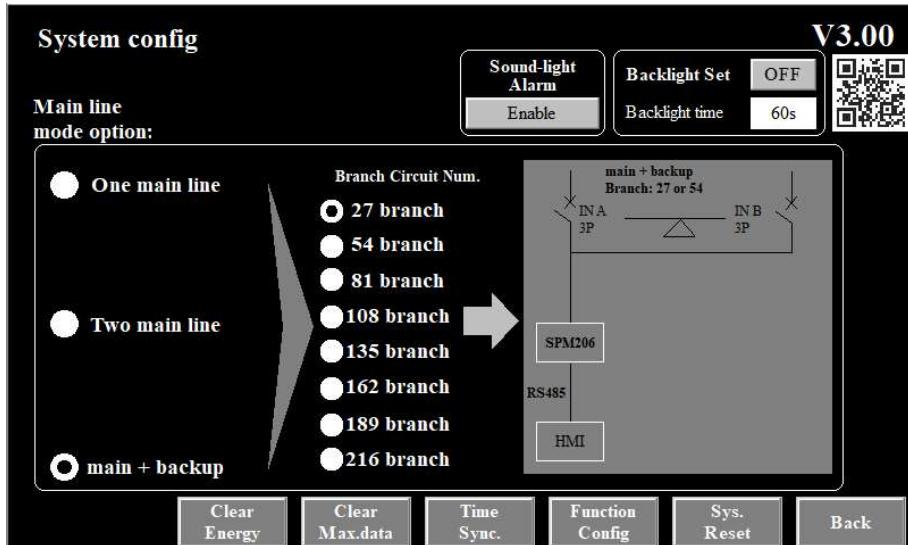
Config to “Two main line” mode, as picture 5.2



picture 5.2

5.1.3 One Main & One Backup Incoming Circuit Configuration

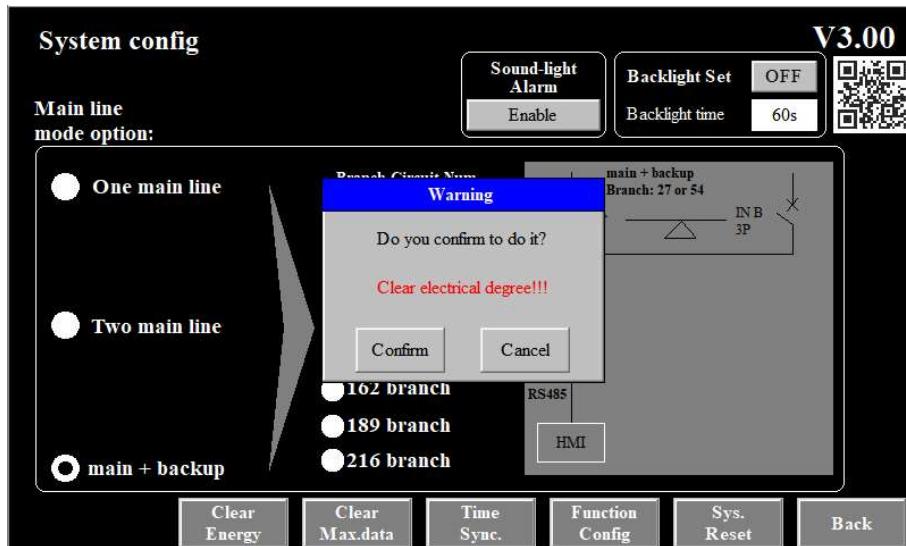
Config to "Main + backup" mode, as picture 5.3



picture 5.3

5.1.4 Clear Energy

Clear the energy data of Main Module to zero, as picture 5.4



picture 5.4

5.1.5 Clear Max. Data

Clear max.data

Clear all the Max. data of Main Module, e.g. Max. current, Max. demand etc

5.1.6 Time Synchronization

Time sync.

Synchronization time on HMI and Main Module

5.1.7 Function Config

Function config

Press “Function config” for setting the system information, shown as picture 5.5

5.1.8 Setting

Set

Press “Set”, then users need to input correct password for further operation

5.1.9 LCD Back Light Setting

Click the input box of back light holding time to set the time. Setting range: 15~900 seconds.

5.1.10 Password Input



When setting Incoming line Clear Max. data, Time Synchronization, Function Config, Set system configuration, users need to input the password first, then can go on further setting.

Factory default password: 201

5.1.11 Password Modification



Device Information setting interface:

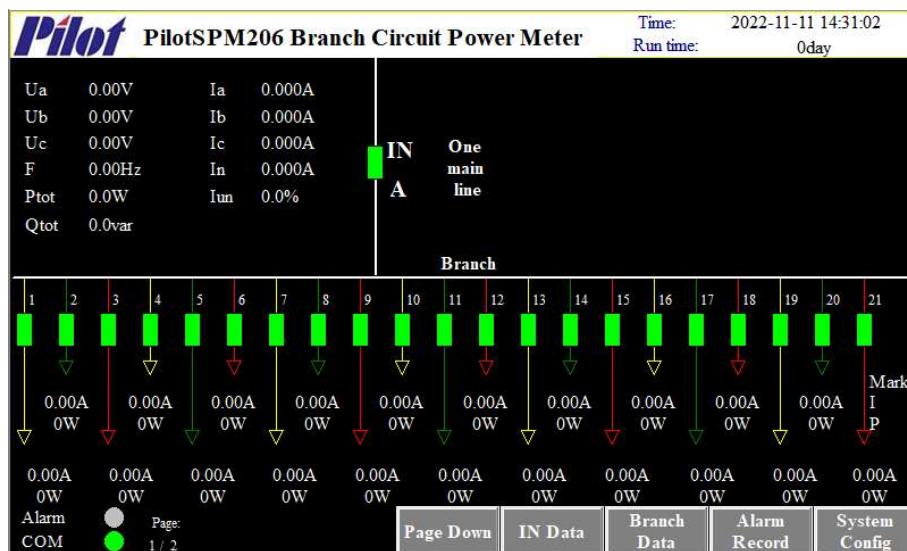
IN A Device config (Module- 1)		Time: 2022-11-11 14:30:29																																															
Readable Area <table border="1"> <tr><td>Model No.</td><td>S/N</td></tr> <tr><td>0</td><td>0</td></tr> <tr><td>Software ver</td><td>Hardware ver</td></tr> <tr><td>0</td><td>0</td></tr> <tr><td colspan="2">Time Set</td></tr> <tr> <td>Y H</td><td>2022 14</td><td>M M</td><td>11 30</td><td>D S</td><td>11 21</td> </tr> <tr><td colspan="6">Set</td></tr> </table>		Model No.	S/N	0	0	Software ver	Hardware ver	0	0	Time Set		Y H	2022 14	M M	11 30	D S	11 21	Set						Setting Area <table border="1"> <tr><td>OF Module</td><td>SD Module</td><td>RH/Temp Module</td></tr> <tr><td>Disable</td><td>Disable</td><td>Disable</td></tr> <tr><td>Time zone</td><td>Vgn</td><td>Leakage Current</td></tr> <tr><td>GMT</td><td>Disable</td><td>Disable</td></tr> <tr><td>V-phase sequence</td><td>Branch DI mode</td><td>Language</td></tr> <tr><td>Disable</td><td>Normal ON</td><td>English</td></tr> <tr><td colspan="3">Read</td></tr> <tr><td colspan="3">Set</td></tr> </table>		OF Module	SD Module	RH/Temp Module	Disable	Disable	Disable	Time zone	Vgn	Leakage Current	GMT	Disable	Disable	V-phase sequence	Branch DI mode	Language	Disable	Normal ON	English	Read			Set		
Model No.	S/N																																																
0	0																																																
Software ver	Hardware ver																																																
0	0																																																
Time Set																																																	
Y H	2022 14	M M	11 30	D S	11 21																																												
Set																																																	
OF Module	SD Module	RH/Temp Module																																															
Disable	Disable	Disable																																															
Time zone	Vgn	Leakage Current																																															
GMT	Disable	Disable																																															
V-phase sequence	Branch DI mode	Language																																															
Disable	Normal ON	English																																															
Read																																																	
Set																																																	
QR Code		Back																																															

Picture 5.5

5.2 Data Display

5.2.1 Real Time Data Display

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



Picture 5.6

5.2.2 DI status display

Main circuit DI: the condition of Incoming Line switch 1 status, green means "OFF", red means "ON", flash means "Error"

Branch circuit DI: the condition of Switch, green means "OFF", red means "ON", flash means "Error"
Case 1: If branch circuit switch mode is "Normally open": Green means "OFF", red means "ON", flash

means “Error”

Case 2: If branch circuit switch mode is “Normally close”: Green means “ON”, red means “OFF”, flash means “Error”

5.2.3 Alarm display



The alarm light will turn red and flash when alarm event occurs. 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

“PageDown”: view next page

“IN. Data”: view data of main incoming circuit.

“Branch Data”: view data of branch circuit.

“Alarm Record”: view real time alarm data.

“System Config”: view the system configuration.

5.3 Main Incoming Circuit Data

Display real-time data of main circuit A, as picture 5.7

IN A Real-time data						
Item	A/ab	B/bc	C/ca	Total	Neutral line	Unit
Phase Voltage	0	0	0		0	V
Line Voltage	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			%
Load current	0	0	0			%
Total kWh				0		kWh
Total kvarh				0		kvarh
PF	0	0	0	0		
S	0.0	0.0	0.0	0.0		VA

IN B

IN Set

Back

Picture 5.7

IN B

, display real-time data of main circuit B.

IN Set

, set the main circuit parameters and alarm.

Back

, back to the last page.

5.4 Branch Outgoing Circuit Data

Display branch circuit real time data, as picture 5.8

Branch 1 to 6 real-time data (IN A)	Module 1	Relay-1: OFF	Relay-2: OFF				
Item/Branch	1	2	3	4	5	6	Unit
Mark							
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
Load current	0.00	0.00	0.00	0.00	0.00	0.00	%
S	0	0	0	0	0	0	VA

Picture 5.8

Energy record

, view the historical energy data.

Set branch

, set the alarm value of the branch circuits.

CT set

, set the CT ampere of branch circuits.

Page up

, view the data of previous group of branch circuits.

Page down

, view the data of next group of branch circuits.

Back

, back to the last page.

IN B

, view the data of main incoming circuit B.

Set DI

, set branch circuit digital input function

5.5 Real-time Alarm Record

On the HMI, it displays max. 15 pieces alarm information, as picture 5.9.

picture 5.9

Historical record

, view the historical alarm record. In this page, it records all the alarm information and digital Input status information. Shown as Picture 5.10

Page up

, view the previous page of alarm record.

Page Down

, view the next page of alarm record.

Back

, back to the last page.

Historical alarm record:

picture 5.10

5.6 Main Incoming Circuit Parameter Config

Config main incoming circuit parameters and alarm value, as picture 5.11

IN A Set (Module- 1)					
COM add:	Baud rate:	Parity:	Main breaker Alarm	Branch breaker Alarm	SD breakdown Alarm
0	4800	None	Disable	Disable	Disable
S2 alarm mode	S4 alarm mode				
ON to OFF	ON to OFF				
Relay-1	Relay-2	S1 function	S2 function	S3 function	S4 function
Universal	Universal	Universal	Universal	Universal	Universal
CT	1	Current lo-lo-limit(A)	0	Neutral current hi-limit	0
Temp. hi-limit(°C)	0	Current lo-limit(A)	0	Leakage current hi-limit	0
Temp. return: (°C)	0	Current hi-limit(A)	0	Vgn hi-limit	0
Voltage hi-limit(V)	0	Current hi-hi-limit(A)	0	Frequency lo-limit	0
Voltage lo-limit(V)	0	Current unbalance limit	0	Frequency hi-limit	0
Apply to All		IN B	Set	Read	Back

picture 5.11

“Apply to All” : Apply the configuration information of this incoming line to all the main modules connected to HMI. All the incoming line settings should be consistent except for the device address.

“Set”: Save the setting data.

“Read”: Read the data.

“Back”: Back to the last page.

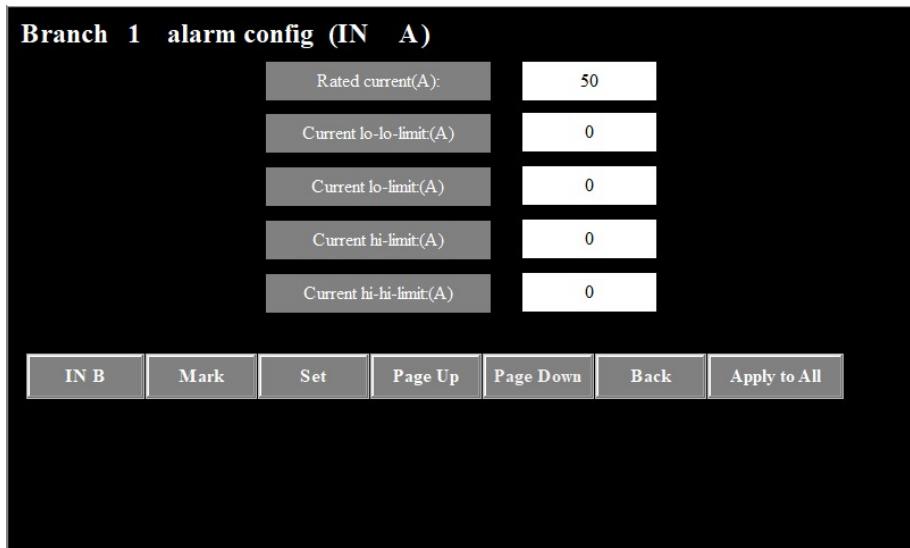
Items	Setting range and Instruction	Remark
Communication Address	1~247	Default: 1
CT ratio	1~400	Default: 1 (If CT spe. is 500/5, set CT ratio=100)
Baud Rate	1200, 2400, 4800, 9600, 19200, 38400	Default: 19200
Parity	None, Odd, Even	None
Main breaker Alarm	Disable : No alarm for main circuit breaker Enable : Alarm for main circuit breaker	
Branch breaker Alarm	Disable : No alarm for branch circuit breaker Enable : Alarm for branch circuit breaker	
SD breakdown Alarm	Disable : No alarm for branch circuit SD breakdown Enable : Alarm for branch circuit SD breakdown	
Relay Function: Relay-1/ Relay-2	Universal : universal relay, user can control it by Modbus function code 05. RUN indication : relay active when the PilotSPM206 runs. Alarm : relay active when there is alarm event for main or branch circuit.	Default set: Alarm

	<p>IN Alarm: relay active when there is alarm event for main circuit.</p> <p>OUT Alarm: relay active when there is alarm event for branch circuit.</p> <p>Tem Alarm: Relay active when the high temperature alarm. It will recover if the temperature back to normal.</p>	
S2 Alarm Mode	<p>ON to OFF: Alarm when S2 changes from ON to OFF</p> <p>OFF to ON: Alarm when S2 changes from OFF to ON</p>	
S4 Alarm Mode	<p>ON to OFF: Alarm when S4 changes from ON to OFF</p> <p>OFF to ON: Alarm when S4 changes from OFF to ON</p>	
DI Function: S-1, S-2, S-3, S-4	<p>Universal: Universal digital input</p> <p>IN Breaker: Main circuit breaker</p> <p>Standby: Spare part</p> <p>Surge protection: The surge protection switch</p> <p>SPD: Surge Protection Device</p>	The main circuit DI can be set to be “Surge protection switch”. After set, the HMI home page will display the Surge protection switch. If the DI status is ON, it means the surge protection switch is ON.
Current lo-lo-limit alarm	<p>1.0~650.0A</p> <p>0 means no alarm function</p> <p>Alarm trigger: when $0 < \text{current} < \text{setpoint}$</p> <p>Alarm restore: 5s after alarm condition is eliminated.</p>	
Current lo-limit alarm	<p>1.0~650.0A</p> <p>0 means no alarm function</p> <p>Alarm trigger: $\text{lo-lo limit value} < \text{current} < \text{setpoint}$</p> <p>Alarm restore: 5s after alarm condition is eliminated.</p>	
Current hi-limit alarm	<p>5.0~650.0A</p> <p>0 means no alarm function</p> <p>Alarm trigger: $\text{hi-hi-limit value} > \text{current} > \text{setpoint}$</p> <p>Alarm restore: 5s after alarm condition is eliminated.</p>	
Current hi-hi-limit alarm	<p>5.0~650.0A</p> <p>0 means no alarm function</p> <p>Alarm trigger: $\text{current} > \text{setpoint}$</p> <p>Alarm restore: 5s after alarm condition is eliminated.</p>	
Neutral current hi-limit alarm	<p>5.0~650.0A</p> <p>0 means no alarm function.</p> <p>Alarm trigger: $\text{current} > \text{setpoint}$</p> <p>Alarm restore: 5s after alarm condition is eliminated.</p>	
Current unbalance limit alarm	<p>5.0%~100%,</p> <p>0 means no alarm function.</p> <p>Alarm trigger: $\text{unbalance rate} > \text{setpoint}$</p> <p>Alarm restore: 5s after alarm condition is eliminated.</p>	Unbalance calculation formula: $(\text{Imax}-\text{Imin})/\text{Imax} \times 100\%$ Imax: 3 phase Max. current

		Imin: 3 phase Min. current
Voltage lo-limit alarm	20.0~300.0V, 0 means no alarm function. Alarm trigger: 0< voltage < setpoint Alarm restore: 5s after alarm condition is eliminated.	
Voltage hi-limit alarm	20.0~300.0V. 0 means no alarm function. Alarm trigger: voltage > setpoint Alarm restore: 5s after alarm condition is eliminated.	
Temperature hi-limit alarm	30.0—120.0 °C 0 means no alarm function. Alarm trigger: Temperature > setpoint Alarm restore: Temperature < setpoint, and 5s after alarm condition is eliminated.	
Temperature return	20.0—120.0 °C 0 means no alarm function. Alarm trigger: Temperature < setpoint Alarm restore: Temperature < setpoint, and 5s after alarm condition is eliminated.	
Frequency lo-limit alarm	45Hz -- 50HZ, 0 means no alarm function. Alarm trigger: 0< Frequency < setpoint Alarm restore: 5s after alarm condition is eliminated.	
Frequency hi-limit alarm	50Hz -- 60HZ, 0 means no alarm function. Alarm trigger: Frequency > setpoint Alarm restore: 5s after alarm condition is eliminated.	
Leakage current hi-limit alarm	0.1—1A, 0 means no alarm function. Alarm trigger: Leakage current > setpoint Alarm restore: 5s after alarm condition is eliminated.	
Neutral-earth Voltage (Vgn) hi-limit alarm	2—10V, 0 means no alarm function. Alarm trigger: Vgn > setpoint Alarm restore: 5s after alarm condition is eliminated.	Neutral-earth voltage also marked as Open

5.7 Branch Outgoing Circuit Parameter Config

Branch circuit alarm setting as picture 5.12



picture 5.12

“Page Up”, last branch circuit data setting.

“Page Down”, next branch circuit data setting I.

“Set”, save and confirm the setting data.

“Back”, back to the last menu.

“Apply to All”, apply all this rated current setting and alarm setting to all other branch circuits.

“Mark”, go to mark the branch circuit. Users can mark the name of branch circuit. After enter the mark, press the key “Set” to save the marking. As shown in Picture 5.17.

Items	Setting Range	Remark
Rated current	10.0~600.0A	Default setting: 50A
Current lo-lo-limit alarm	1.0~250.0A, 0 means no alarm function. Alarm trigger: $0 < \text{current} < \text{setpoint}$ Alarm restore: 5s after alarm condition is eliminated.	
Current lo-limit alarm	1.0~250.0A, 0 means no alarm function. Alarm trigger: $\text{lo-lo limit} < \text{current} < \text{setpoint}$ Alarm restore: 5s after alarm condition is eliminated.	
Current hi-limit alarm	5.0~650.0A, 0 means no alarm function. Alarm trigger: $\text{hi-hi limit} > \text{current} > \text{setpoint}$ Alarm restore: 5s after alarm condition is eliminated.	
Current hi-hi-limit alarm	5.0~650.0A, 0 means no alarm function. Alarm trigger: $\text{current} > \text{setpoint}$ Alarm restore: 5s after alarm condition is eliminated.	

5.8 History Energy Record

Display history yearly energy data (last 10 years energy data), as picture 5.13

XXXXYear	1	to	42	Yearly Kwh	IN	0.0	kWh	
Branch	1	2	3	4	5	6	7	Unit
Energy data	0.0	0.0	0.0	0.0	0.0	0.0	0.0	kWh
Branch	8	9	10	11	12	13	14	Unit
Energy data	0.0	0.0	0.0	0.0	0.0	0.0	0.0	kWh
Branch	15	16	17	18	19	20	21	Unit
Energy data	0.0	0.0	0.0	0.0	0.0	0.0	0.0	kWh
Branch	22	23	24	25	26	27	28	Unit
Energy data	0.0	0.0	0.0	0.0	0.0	0.0	0.0	kWh
Branch	29	30	31	32	33	34	35	Unit
Energy data	0.0	0.0	0.0	0.0	0.0	0.0	0.0	kWh
Branch	36	37	38	39	40	41	42	Unit
Energy data	0.0	0.0	0.0	0.0	0.0	0.0	0.0	kWh

Search last Year

Picture 5.13

“Refresh”, press this key to refresh the display data.

“Monthly energy”, view all branch circuit monthly energy data, as shown in Picture 5.14

“Back”, back to the last page.

Display history monthly energy data (last 12 months energy data) as picture 5.14

XXXX Year XX Monthly	1	to	42	Monthly Kwh(IN A)	IN	0.0	kWh	
Branch	1	2	3	4	5	6	7	Unit
Energy data	0.0	0.0	0.0	0.0	0.0	0.0	0.0	kWh
Branch	8	9	10	11	12	13	14	Unit
Energy data	0.0	0.0	0.0	0.0	0.0	0.0	0.0	kWh
Branch	15	16	17	18	19	20	21	Unit
Energy data	0.0	0.0	0.0	0.0	0.0	0.0	0.0	kWh
Branch	22	23	24	25	26	27	28	Unit
Energy data	0.0	0.0	0.0	0.0	0.0	0.0	0.0	kWh
Branch	29	30	31	32	33	34	35	Unit
Energy data	0.0	0.0	0.0	0.0	0.0	0.0	0.0	kWh
Branch	36	37	38	39	40	41	42	Unit
Energy data	0.0	0.0	0.0	0.0	0.0	0.0	0.0	kWh

Search last Monthly

Picture 5.14

5.9 Branch Circuit CT Setting

Notice

After set the CT, Users need to restart the PilotSPM206 main module, then the setting will be effective.
For setting phase position, please make sure the phase sequence on site is matching the configuration.
No require to restart the PilotSPM206 for setting phase position.

Branch Circuit CT config as picture 5.15

Branch 1 to 21 CT config (IN A)

1 - 3 50A	4 - 6 50A	7 - 9 50A	10 - 12 50A
13 - 15 50A	16 - 18 50A	19 - 21 50A	

IN B Page Down Set phase position Set Read Back

picture 5.15

“Page Down”, go to set the CT of next group

“Set phase position”, go to set the CT phase sequence, shown as Picture 5.16

“Set”, save the CT setting.

“Read”, read the CT specification.

“Back”, back to last page.

Phase position configuration interface

Branch 1 to 21 phase config

A B C	A B C	A B C	A B C
1 ● ○ ○	4 ○ ● ○	7 ○ ● ○	10 ○ ● ○
2 ○ ● ○	5 ○ ○ ●	8 ○ ○ ●	11 ○ ○ ●
3 ○ ○ ●	6 ○ ○ ○	9 ○ ○ ○	12 ○ ○ ○
A B C	A B C	A B C	
13 ○ ● ○	16 ○ ● ○	19 ○ ● ○	
14 ○ ○ ●	17 ○ ○ ●	20 ○ ○ ●	
15 ○ ○ ○	18 ○ ○ ○	21 ○ ○ ○	

Page Down CT config Set Read Back

Picture 5.16

5.10 Branch Circuit Mark

Go to the menu “Set Branch”, and press “Mark”, users can mark the name of branch circuit. The mark should be named by 8 digits (letters and numbers)

Branch 1 to 21 mark set					
1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21			

Page Down **Set** **Read** **Back**

Picture 5.17

6. Maintain and Trouble Shooting

Possible Question	Possible Reason	Solutions
Device no display after input power supply	The power did not input to the device	<p>Check the power supply terminals on device to make sure whether input correct operating voltage</p> <p>Check control source fuse did not be burned</p>
Measuring value not correct or non-conformance with expect value	Voltage measurement not correct	<p>Check measuring voltage whether match with rated parameter</p> <p>Check connection wiring</p>
	Current measurement not correct	<p>Check measuring current whether match with rated parameter</p> <p>Check CT setting</p> <p>Check connection wiring</p>
	Power measurement not correct	<p>Check voltage / current phase sequence</p> <p>Check current dotted terminal</p> <p>Check CT phase sequence</p>
Branch Circuit Switch Status no operation	DI module communication stop	<p>Check DI module communication indicate light</p> <p>Check DI module communication connection wiring</p>
	DI operation voltage incorrect	<p>Check outside node types whether match with device rated parameter</p> <p>Check outside connection wiring</p>
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	<p>Check system configuration</p> <p>Check main module dial switch</p>

Notice:

- PILOT reserves the right to modify this manual without prior notice in view of continued improvement.
- Contact email: marketing@pmac.com.cn



Add: No. 15, Keji 6 Road, ChuangxinHaian, Tangjia High-tech Zone, Zhuhai, Guangdong, 519085 China

Tel: +86-756-6931888 ext 6088 / +86-756-3629688

Fax: +86-756-3629670

<http://www.pmac.com.cn>