F-MPM200 Multi-function Power Meter User Manual	Document Version	Confidential
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F-MPM200 Multi-function Power Meter User Manual

The user manual is suitable for the following model:：

Module	Product type

Xiamen Four-Faith Smart Power Technology Co., Ltd.
Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen,Fujian,China.
Hotline: 400-8838-199
Tel：+86 592-6300320
Fax:+86 592-5912735
Web:en.four-faith.net

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Note: There may be differences in accessories and interfaces of different models.please refer to the actual product

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Safety and precautions

Danger and warning!

This device can be installed only by professionals.

The manufacturer shall not be held responsible for any accident caused by the 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 and power supply and short-circuit the secondary winding of all current transformers.
- Use appropriate voltage tester to make sure the voltage has been cut-off.
- 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 could cause damage to equipment or injuries to people.

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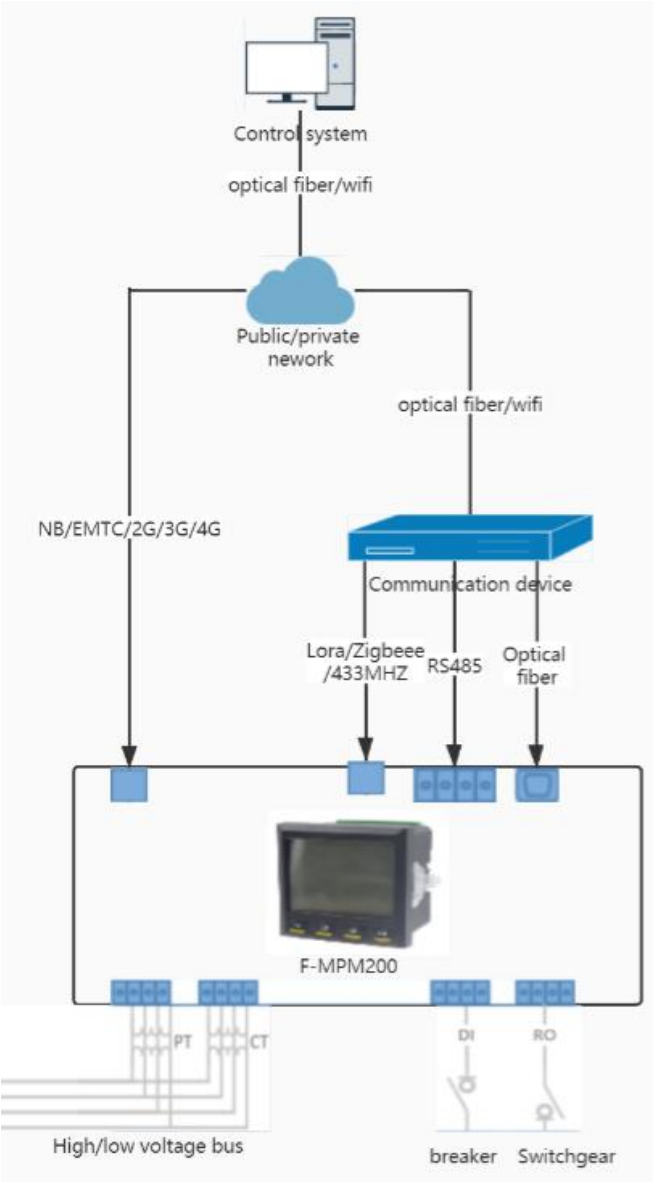
Chapter 1 Brief Introduction of Product

1.1 General

F-MPM200multifunction power meter is a product designed for the needs of power systems, industrial and mining enterprises, public facilities, and power intelligent monitoring. It can measure all conventional power parameters, integrates measurement, metering, and communication functions, and supports serial communication and cellular network communication.

The active energy measurement accuracy of this product meets the requirements in GB/T17215.322-2008 (static active energy meter 0.5S); the reactive energy measurement accuracy meets GB/T17215.323-2008 (static reactive energy meter level 2) Regulations in; communication conforms to Modbus protocol.。



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1.2 Features and Benefits

- **Design for Industrial Application**
- High-powered industrial 32bits CPU
- Power range: (85~264VAC/VDC,45~65Hz)
- Internal power supply and communication power supply adopt isolated power supply
- Built-in real-time clock (RTC)

- **Stability and Reliability**
- Support hardware and software WDT
- RS485 port: 15KV ESD protection
- Power port: reverse-voltage and over voltage protection
- Built-in micro UPS, save important data when power off suddenly.
- Detection accuracy in compliance with national standards
- **Standard and Convenience**
- Some ports adopt industrial plug-able terminal interface, which is especially suitable for industrial applications
- Provide a standard RS485 interface, which can be directly connected to serial devices
- Intelligent data terminal, can auto enter data transmission state after power on
- Convenient system configuration and maintenance interface
- The function is easy to expand, the expansion method is simple and diverse
- **Powerful**
- Complete electrical parameter measurement function
- Multi-type electric energy data measurement function
- With power quality analysis function
- It has a clock circuit with temperature supplement
- With the most value statistics function, demand statistics function
- With customized over-limit function
- Multiple data storage functions, comprehensive event recording functions
- Digital input (DI), digital output (DO)
- Analog input (AI), analog output (AO)
- Active and reactive power 2 pulse output
- With ModBus communication, cellular network communication
- **Certification**
- Insulation performance, vibration performance, anti-interference performance are all in line with Q-GDW615-2011
- Electrostatic discharge immunity test: can withstand the test of level 4 specified in GB/T 17626.2-2006
- Radio frequency electromagnetic field radiation immunity test: can withstand the test of level 4 specified in GB/T 17626.3-2006
- Electrical fast transient pulse group immunity test: can withstand the test of level 4 specified in GB/T 17626.4-2008
- Surge (impact) immunity test: can withstand the test of level 4 specified in GB/T 17626.5-2008
- Damped oscillating wave immunity test: can withstand the test level specified in Table 2 of GB/T 17626.12 as level 4 damping
- **Function**

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- Power distribution monitoring: real-time monitoring and statistics of energy consumption
- Energy consumption monitoring: collect user energy data
- Power quality management: monitoring smart capacitors, three-phase imbalance monitoring and power quality data monitoring
- Load management: remote control, voltage monitoring, etc.

1.3 Working Principle

F-MPM200 multi-function power meter is mainly composed of current sampling unit, voltage sampling unit, micro-controller, internal storage unit, clock unit, power supply and battery unit, DI/DO input and output interface, Optional AI/AO (4 ~20mA) analog input and output interfaces and communication interfaces. The principle diagram is shown in Figure 1-2

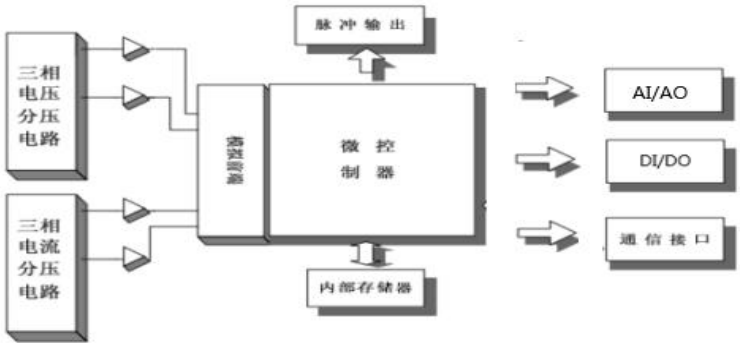

Figure 1-2

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Chapter 2 Technical index

2.1 Measurement and functions

Function item	Standard	Auxiliary module
Three phase voltage & average phase voltage	●	
Three line voltage & average line voltage	●	
Three phase current & average phase current	●	
Three phase active Power& total active Power	●	
Three phase reactive Power& total reactive Power	●	
Three phase apparent Power& total apparent Power	●	
Three phase power factor & total power factor	●	
Three phase input/output Active Energy & total input/output Active Energy	●	
Three phase input/output reactive Energy & total input/output reactive Energy	●	
Frequency	●	
Demand	●	
Multi-Tariff Energy	●	
Power Quality		
Total voltage/current Harmonics Distortion	●	
Total voltage/current odd Harmonics Distortion	●	
Total voltage/current even Harmonics Distortion	●	
voltage/current Harmonic Ratio（2^{nd}~31^{st}）	●	
Voltage crest factor & current K factor	●	
Voltage Unbalance Rate	●	
Recording		
100 pcs SOE log	●	
Voltage/frequency deviation record	●	
Voltage unbalance rate record	●	
Voltage unbalance rate record	●	
Maximum demand record	●	
Real-time maximum value record	●	
Historical multi-rate electric energy record	●	
Input &Output		
DI	3	3*
DO	2	2*
AI		2*
AO		2*
Electricity pulse		2*
Communication		
First way ModBus	●	
Second way ModBus		1*
ETH		1*
Cellular network	●	

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- The wireless communication function is provided on the body, which can directly communicate with the communication management machine, and can directly connect to the serial port RS485 device.
- One standard RS485 MODBUS communication on the main body, the expansion module provides an additional one MODBUS communication.
- The body provides 3 DIs and 2 DOs, and the expansion module can provide up to 3 DIs or 2 DOs.
- The main body does not provide AI and AO functions, and the expansion module provides 2-channel AI and 2-channel AO functions.
- The pulse output function is not provided on the main body. The expansion module provides 1 active pulse output and 1 reactive pulse output.

The main body does not provide Ethernet communication function. The expansion module provides 1 Ethernet interface for remote access and configuration.

2.2 Working voltage and power consumption

Item	Content
Standard power	220VAC 50Hz
Supply range	85~265VAC/VDC
Frequency	45~65Hz

2.3 Physical characteristics

Item	Content
shell	ABS flame-retardant material, the shell and the system are safely isolated
size	96*96*65.5mm (not including antenna, installation parts, and expansion modules)
weight	0.55kg (Including installation parts and packaging)

2.4 Environment

Item	Content
Work temperature	-10～+55℃
Storage temperature	-40～+70℃
Relative humidity	5%~95% (No condensation)

2.5 Cellular parameters（opthional）

Item	Content
Frequency	Support LTE FDD 2600/2100/1800/900/800MHz, optional 700/1700/2100MHz Support DC-HSPA+/HSPA+/HSDPA/HSUPA/UMTS 850/900/2100MHz tri-band, optional 800/850/1900/2100MHz quad-band

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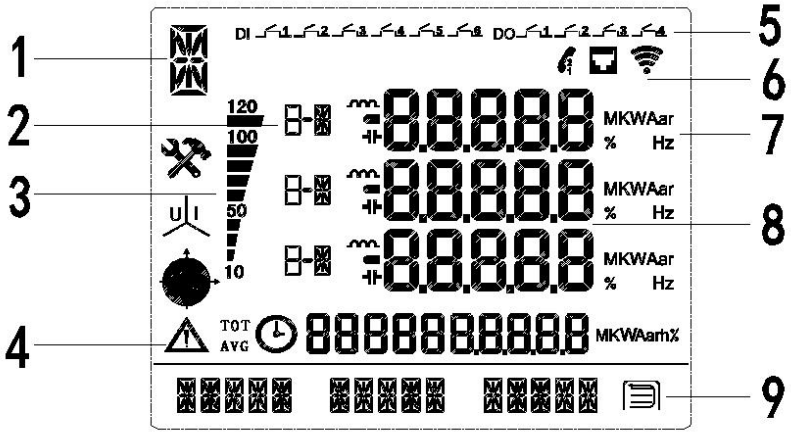
	Support EDGE/GPRS/GSM 850/900/1800/1900MHz quad frequency Support GPRS CLASS 10 Support EDGE CLASS 12
Theoretical bandwidth	LTE FDD: Downlink rate 100Mbps, uplink rate 50Mbps DC-HSPA+: Downlink rate is 42Mpbs, uplink rate is 5.76 Mbps HSPA+: Downlink rate 21Mpbs, uplink rate 5.76 Mbps HSDPA: Downlink rate 7.2Mbps, HSUPA: Uplink rate 5.76Mbps UMTS: 384Kbps
Transmit power	<23dBm
Receiving sensitivity	>-97dBm

2.6 Auxiliary module

Module name	Function	Show	Communication	Max Auxiliary module
SW	3 ways Digital input	status	Status and control	1
R	2 Ways relay output	status	Status and control	1
AO	2 Ways analog output	no	no	1
AI	2 Ways analog input	value	value	1
C	1 way ModBus communicate	no	no	1
EP	2 ways pulse output	no	no	1
LAN	1 way 10/100M ETH	no	no	1

2.7 Display and Key-press

1: Page
2: Item
3: Load rate
4: Alarm
5: DI/DO status
6: Communication
7: Unit
8: Data display area
9: Key prompt



Description:

Load rate can visually display the current load condition of meter. The display content is the percentage of the average current to the rated current, accurate to 10%, the left range ranges from 1% to 120%, and each cell represents 10%. For example, when the

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rated current is 5A and the average current is 4.8000A, the load ratio is 90%, and the 1%~90% part of the range will be displayed.

DI/DO status prompt displays the current DI/DO status. Each switch symbol represents a DI or DO signal. When there is a DI signal or the relay is closed, the corresponding pair of switches are closed; otherwise, it is open.

Communication prompt display the communication status. When there is a communication function, the "phone" symbol is displayed; when there is communication, the corresponding prompt is displayed according to the number of communications, otherwise it goes out. For example, if the first communication is in progress, the word "1" next to "Phone" will be displayed

Alarm prompt, when 7 types of errors such as real-time measurement data read/write error, non-volatile data read/write error, sampling error, communication error, and electrical parameter calculation error occur during the operation of the instrument, the alarm prompt will be Lights up, and the error will be recorded and saved according to its own error type. Each type of record will save the last 10 error records. If the user finds that an alarm prompt appears, please call the company's technical consulting service for error judgment and error elimination.

2.8 Control and event

F-MPM200 can provide more complex functions through appropriate hardware and software: internal clock, set value over-limit control alarm output, event recording and multi-rate statistics.

Through the programmable control system, users can define the working mode of the relay by themselves.

Through the open communication protocol, users can set the relay working mode by themselves;

they can also configure on-site through the supporting software provided by our company.

F-MPM200 provides a precise clock module internally, which can record various events collected by the instrument, such as switching value changes, relay actions or internal fixed value actions. Various recorded events have time stamps, which can facilitate the user to analyze afterwards.

For more detailed function description, please refer to the following chapters.

Chapter 3 Measuring Function Description

3.1 measuring parameter

Parameter	Measuring Range
Voltage	0~65KV
Current	0~9999A
Active Power	Per phase 0~649.9MW
Reactive Power	Per phase 0~649.9MVar
Apparent Power	Per phase 0~649.9MVA
Frequency	45~65Hz

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3.1.1 voltage

While measuring voltage lower than 398Vph-N / 690Vph-ph, F-MPM200 do not need to connect external PTs, it can be input directly. While measuring other higher voltage, F-MPM200 need external PTs. If F-MPM200 is connected via PTs, the PTs direct affect the measurement accuracy of the meter. So, users should consider the linearity and accuracy rate of PTs.

Normally, Overload capacity of voltage measurement is 120% of rated voltage. Users should pay attention on the voltage input when using the device, and avoid getting wrong data caused by over-scope measurement. Max. rated measuring range is 65KV.

Connection mode of voltage input can be set via panel or communication.

Four-Faith low voltage meter and high voltage meter support both 3-phase 3-wire and 3-phase 4-wire

Tips: It is recommended to clear the energy after change the connection mode

The setting range of PT primary side is 0.1 kV~65 kV, which is not less than the rated voltage.

3.1.2 current

Only when adopt CTs can F-MPM200 measures current. CT secondary rated output must comply with rated current input of F-MPM200 (5A or 1A). When connecting external CTs, users must make sure the current is not open circuit. Otherwise, primary excitation will generate high voltage at secondary circuit, causing personal injury or death and equipment damage.

Normally, overload capacity of current measurement is 120%of rated current. Users should pay attention to the current input when using the device, and avoid getting wrong data caused by over-scope measurement.

Rated measuring range of current is 0to 9999A.

CT primary setting range is from 1A to 9999A, and it should not smaller than the rated current value

3.1.3 Active power

F-MPM200 calculates three phase active power and total active power: Pa, Pb, Pc, and Total Active power

Measuring range: per phase 0~ 649.9MW, total: 0~ 1949.8MW.

3.1.4 Reactive power

F-MPM200 calculates three phase reactive power and total reactive power: Qa, Qb, Qc, and Qtot

Measuring range: per phase 0~ 649.9MVar, total: 0~ 1949.8MVar

Attention
1. Both active power and reactive power value have signs.

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2. When wiring, users should pay attention to the phase sequence of voltage and current. Otherwise, it may cause wrong measuring data. Besides, it is necessary to connect the CTs terminals correctly; otherwise there will be negative power value.

3.1.5 Apparent power

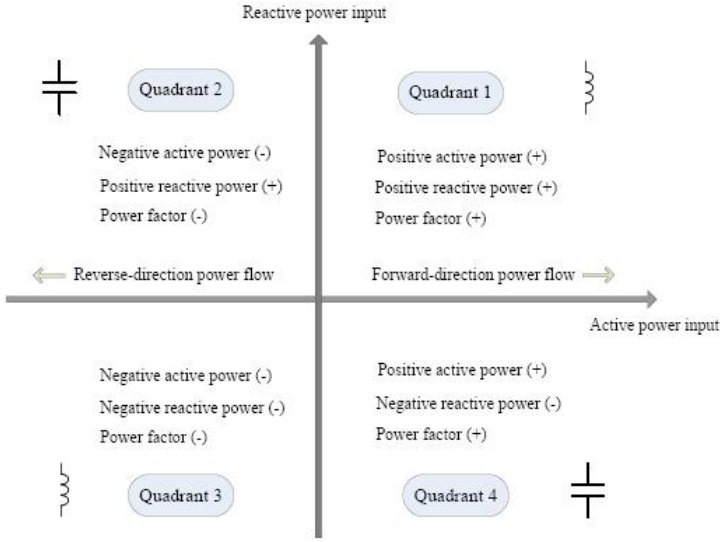
F-MPM200 calculates three phase apparent power and total apparent power: Sa, Sb, Sc and Stot.

Measuring range: per phase 0~649.9MVA, total: 0~ 1949.8MVA

3.1.6 Power factor

F-MPM200 measures per phase power factor and total power factor: PFa, PFb, PFc and PFtot. Measuring range: -1.000 to +1.000.

Like active / reactive power value, the wiring and CTs terminals connecting will affect actual calculated value of power factor.



3.1.7 Frequency

In different connection modes, F-MPM200 samples the system frequency from different channels. In 3-phase 3-wire connection mode, F-MPM200 samples the frequency from line AB voltage channel. In other connection modes, it samples frequency from phase A voltage channel. In case phase A voltage is failure, it samples frequency from phase C voltage channel. In case both phase A and C voltage are failure, it samples from phase B voltage channel.

3.1.8 Demand calculation

F-MPM200 provides demand analysis for three phase current, total active power, total reactive power and total apparent power.

F-MPM200 supports two demand modes: Fixed Block and Rolling Block.

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Users can set demand interval as 5min, 10min, 15min, 30min or 60min.

In Fixed Block mode, users do not need to set the subinterval.

In Rolling Block mode, users should set subinterval the subinterval: 1min, 2 min, or 3 min. Show as below sheet:

Optional Intervals (mins)	Programmable Subintervals (mins)
5	1
10	1 or 2
15	1 or 3
30	1, 2, or 3
60	1, 2, or 3

The demand calculation values can be check and clear by LCD or communication. it holds the max.demand value on the non-volatile memory of MPM-200.

3.2 Power Quality Analysis

Item	Parameter	Measuring Range	Accuracy
THD	THD for voltage	0~100%	Class B
	TOHD for voltage	0~100%	Class B
	TEHD for voltage	0~100%	Class B
	THD for current	0~100%	Class B
	TOHD for current	0~100%	Class B
	TDHD for current	0~100%	Class B
Harmonic Ratio	HR for voltage	2~31st	Class B
	HR for current	2~31st	Class B
Harmonic RMS	Harmonic voltage RMS	0~31st	Class B
	Harmonic current RMS	0~31st	Class B
	Harmonic power RMS	0~31st	Class B
	Harmonic energy	1~13th	Class B
Other	Voltage crest factor	/	Class B
	Current K factor	/	Class B
	Frequency deviation	0~100%	Class B
	Voltage deviation	0~100%	Class B
	Voltage Current unbalance	0~100%	Class B

3.2.1 General Description

Harmonics are any “non-linear” current or voltage in an electrical distribution system. With these harmonics flowing into the power system, it will affect the reliability of the transformers and protection relays, and it will accelerate the ageing of metalized polyester film, increase the power loss of transmission, and disturb communication or measurement accuracy of instruments.

MPM110 provides up to 31stharmonics analysis which is strong helpful for power quality analysis.

3.2.2 THD

F-MPM200measures voltage and current harmonic up to 31st, and calculates THD, TOHD (Odd) and TEHD (Even).

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Users can read THD data (%) from the LCD or communication. For example, the data is 20.00, the actual THD value is 20.00%

3.2.3 Harmonic Ratio for Voltage

F-MPM200 measures up to 31st voltage harmonic. It basically meets the demand of harmonic research in the field of electrical technology， which is 2≤n(Number of harmonics）≤40

Users can read 2~31st voltage harmonic (%) from the LCD or communication. For example, the data is 10.00, the actual harmonic value is 10.00%.

User can view the per harmonic ratio for voltage from panels and communication.

Attention
Each harmonic component can be queried through the display panel, or remotely through the communication port.

3.2.4 Harmonic Ratio for Current

F-MPM200 measures up to 31st current harmonic. Users can read 2~31st current harmonic (%) from the LCD or communication. For example, the data is 10.00, the actual harmonic value is 10.00%.

3.2.5 Voltage Crest Factor

F-MPM200 measures 3 phase voltage crest factor, data resolution: 0.001. If no voltage input, the CF value is 0. Users can read CF value from the LCD or communication.

Crest Factor Formula:

$$\mathrm{CF} = 1.414 \times \sum_{h=1}^{N} U_h / U_1$$

In the formula, Uh is the hharmonic RMS, U1is fundamental harmonic RMS. Nis the highest order harmonic.

3.2.6 Current K Factor

F-MPM200 measures 3 phase current K factor, data resolution: 0.001. If no current input, the K Factor value is 0. Users can read K Factor value from the LCD or communication.

K Factor Formula:

$$\mathrm{K\ Factor} = \sum_{h=1}^{N} (I_h \times h)^2 / \sum_{h=1}^{N} (I_h)^2$$

In the formula, Ih is the hharmonic current ratio, h is theharmonic order number, N is the highest order harmonic.

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3.2.7 Harmonic Voltage RMS

F-MPM200 measures 0~31stharmonic voltage RMS, data resolution: 0.01V. Users can read every order of harmonic voltage RMS from the LCD or communication.

3.2.8 Harmonic Current RMS

F-MPM200 measures 0~31stharmonic current RMS, data resolution: 0.0001A. Users can read every order of harmonic current RMS from the LCD or communication.

3.2.9 Harmonic Power RMS

F-MPM200 measures 0~31stharmonic power (total active power) RMS, data resolution: 0.1W. Users can read every order of harmonic power RMS from the LCD or communication.

3.2.10 Harmonic Energy

F-MPM200 measures 0~13thharmonic energy (total kWh), data resolution: 0.1 kWh. Users can read every order of harmonic energy from the LCD or communication.

3.2.11 Frequency Deviation

F-MPM200 calculates the Frequency Deviation, data resolution: 0.01Hz

Frequency deviation means the difference between the actual frequency and the nominal frequency

Formula: Frequency Deviation = Actual Frequency – Nominal Frequency

Users can set the Nominal Frequency in F-MPM200via communication. There are 50Hz or 60Hz for option.

Besides, F-MPM200 records the over-limit event for frequency deviation. Users can set a limit value for the frequency deviation.

When the real-time frequency deviation is out of limit, F-MPM200 will record the event with time stamp, its duration time and the Peak value. F-MPM200 can store 30 events log for frequency deviation.

3.2.12 Voltage Deviation

F-MPM200 calculates 3-phase voltage deviation which is the percentage of deviation compared with its nominal value.

Formula:

Voltage Deviation(%) = (Actual voltage – Nominal voltage)/ Nominal voltage×100%

In above formula, the Nominal voltage is rated voltage. The voltage deviation has a negative or positive sign.

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Besides, F-MPM200 records the over-limit event for voltage deviation. Users can set a limit value for the voltage deviation.

When the real-time voltage deviation is out of limit, F-MPM200 will record the event with time stamp, its duration time and the Peak value. F-MPM200 can store 30 events log for voltage deviation.

3.2.13 Voltage Unbalance Rate

F-MPM200 calculates 3 phase voltage unbalancerate. Data resolution: 1%.

Formula:

$$\varepsilon_U = \frac{U_2}{U_1} \times 100\%$$

U1 is 3-phase voltage positive-sequence component RMS

U2 is 3-phase voltage negative-sequence component RMS

Besides, F-MPM200 records the over-limit event for voltage unbalance. Users can set a limit value for the voltage unbalance.

When the real-time voltage unbalance is out of limit, F-MPM200 will record the event with time stamp, its duration time and the Peak value. F-MPM200 can store 30 events log for voltage unbalance. Meanwhile, F-MPM200 also records the Peak unbalance in present day/ month/ history.

3.3 Energy and Multi-tariff Energy Statics

3.3.1 General Description

According to the direction of power, F-MPM200 calculates 4 quadrant kWh/ kvarh, apparent energy, multi-tariff energy and history energy data,

F-MPM200accumulates the energy value since it was powered on at the first time. (In that case users clear the energy to 0, the meter will re-accumulate the energy from 0)

Until the value reach 99,999,999.9 kWh/ kvarh, it will auto-turnover.

Under different connection mode, F-MPM200 accumulates the energy in different way, as below sheet:

Connection mode	Energy calculation
3-phase 4-wire	Per phase 4 quadrant energy Total energy Multi-tariff energy History energy
3-phase 3-wire	Total energy Multi-tariff energy History energy

Note: User can clear the energy to 0 on panel by keys, or clear from communication.

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3.3.2 Active Energy

F-MPM200 calculates the active energy according to the accumulated active power. And it distinguishes the direction of active/ reactive power to separately calculate per phase/ total active energy in 4 quadrants.

3.3.3 Reactive Energy

F-MPM200 calculates the reactive energy according to the accumulated reactive power. And it distinguishes the direction of active/ reactive power to separately calculate per phase/ total reactive energy in 4 quadrants.

3.3.4 Multi-tariff Energy

F-MPM200 statistics the import/ export kWh and import/ export kWh in different tariff.

F-MPM200 supports 2 tariff lists. Users can set the 2 lists separately. Each tariff list can be set max. 8 periods in one day and 4 different tariff (F1, F2, F3, F4 means 4 kinds of tariff, and F1 for Sharp, F2 for Peak, F3 for Flat, F4 for Valley).

Below example for setting the tariff lists:

Tariff List	Num. of period	Period order	Starting time (to end time)	Tariff
Tariff List 1	8	1st period	00:00 (to 03:00)	F1
		2nd period	03:00 (to 06:00)	F2
		3rd period	06:00 (to 09:00)	F4
		4th period	09:00 (to 12:00)	F3
		5th period	12:00 (to 15:00)	F1
		6th period	15:00 (to 18:00)	F4
		7th period	18:00 (to 21:00)	F2
		8th period	21:00 (to 00:00)	F3
Tariff List 2	5	1st period	06:00 (to 10:00)	F1
		2nd period	10:00 (to 12:00)	F2
		3rd period	12:00 (to 14:00)	F1
		4th period	14:00 (to 20:00)	F3
		5th period	20:00 (to 06:00 of next day)	F4

There are 2 modes to calculate the multi-tariff energy: Date Mode and Holiday Mode.

Under Date Mode, it divides one year (365 days) into 2 periods

Under Holiday Mode, it divides the days by working day and holiday. Working day is from Monday. to Friday. Holiday is from Saturday to Sunday.

Below example for setting the mode:

Mode	Time Zone 1 (use the Tariff List 1)	Time Zone 2 (use the Tariff List 2)
Date Mode	From Jan.1 to May. 30	From Jun.1 to Dec.31
Holiday Mode	From Mon. to Fri.	From Sat. to Sun.

Attention

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1. Users can divide one day (24 hours) up to 8 periods, and set 4 tariff maximum.

2. Each period must >15 minutes, and the duration must be a multiple of 15.

3. The starting time of each period must be in ascending order

4. The multi-tariff only can be set from communication. It can't be set on panel.

5. If 2 different periods use the same tariff, the meter will combine the energy of 2 periods together.

6. The system default that: Time Zone 1 uses the Tariff List 1, and Time Zone 2 use the Tariff List 2. User can't change it.

3.3.5 History Energy

F-MPM200 statistics daily energy of last 31 days, and statistics monthly energy of last 12 months. User can read the history energy as below:

Daily energy of last 31 days	Import kWh/ kvarh, Export kWh/ kvarh
Monthly energy of last 12 months	(Each tariff) Import kWh/ kvarh, (Each tariff) Export kWh/ kvarh

3.4 Record Function

3.4.1 General Description

In order to facilitate users to do various fault analysis, F-MPM200 provides up to 100 records of SOE event and 30 records of over-limit event for frequency deviation/ voltage deviation/ voltage unbalance. Users can easily and quickly position seeking the fault from the SOE event counter.

Additional, F-MPM200 also provides records of Max. demand and Max./ Min. data for users doing analysis of electricity consumption.

3.4.2 SOE Event Log

F-MPM200 can record the event of switch and relay position (i.e. ON/ OFF status.) The event is recorded with time stamp which is stored in F-MPM200 by UNIX time format. Time resolution is 1ms. The UNIX time is a system for describing instances in time, defined as the number of seconds that have elapsed since the midnight 00:00:00 on January 1, 1970.

From Four-Faith software, users can see the event as below format:

No.	Event
1	2011-07-28 09:31:34 792ms Relay 1 ON

More detail，please refer to F-MPM200_MODBUS protocol

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3.4.3 Frequency Deviation Record

User can set the frequency deviation over-limit value in F-MPM200 (default limit: 0.2Hz, setting range: 0~10Hz).When the ｜frequency deviation｜> limit, F-MPM200 records the deviation starting time, ending time, and the Max. deviation (value with sign). Users can find the record from panel and communication.

Once the event happen, users can find the record in Four-Faith software as below format:

No.	Event
1	2011-07-28 09:31:34 to 2011-07-28 09:32: 15, frequency deviation, Max. value is 0.50Hz

More detail，please refer to F-MPM200_MODBUS protocol

3.4.4 Voltage Deviation Record

User can set the voltage deviation over-limit value in F-MPM200 (default limit: 10%, setting range: 0~99.99%).When the ｜voltage deviation｜> limit, F-MPM200 records the deviation starting time, ending time, and the Max. deviation (value with sign). Users can find the record from panel and communication.

Once the event happen, users can find the record in Four-Faith software as below format:

No.	Event
1	2011-07-28 15:02:25to 2011-07-28 15:30:46, voltage deviation, Max. value is -14%

More detail，please refer to F-MPM200_MODBUS protocol

3.4.5 Voltage Unbalance Rate Deviation Record

User can set the voltage unbalance over-limit value in F-MPM200 (default limit: 20%, setting range: 0~100%).When unbalance > limit, F-MPM200 records the unbalance starting time, ending time, and the Max. unbalance value. Users can find the record from panel and communication.

Once the event happen, users can find the record in Four-Faith software as below format:

No.	Event
1	2011-07-28 06:05:25to 2011-07-28 06:28:35, voltage unbalance Max. unbalance value is 24%

More detail，please refer to F-MPM200_MODBUS protocol

3.4.6 Max. Demand Record

F-MPM200 records the max. demand for 3-phase current, total active power, total reactive power, total apparent power.

When the instant demand exceeds the history maximum demand, F-MPM200 will record the new maximum data with time stamp.

User can clear the Max. demand record from panels and communication.

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3.4.7 Real time Max./ Min. Record

F-MPM200 records the max./ min. for 3-phase voltage (ph-N and ph-ph)/ 3-phase current/ active power/ reactive power/ apparent power.

When the instant value exceeds the history maximum or lower than history minimum, F-MPM200 will record the new max./ min. data with time stamp.

User can clear the Max./ Min. record from panels and communication.

3.5 Setpoint Alarm

3.5.1 General Description

F-MPM200 provides configurable setpoint alarm for all parameters. It supports monitor 2 parameters at the same time.

3.5.2 setpoint analysis

3.5.2.1 setpoint type

There are 2 setpoint types: Over-limit and Under-limit. Users can set the limit as per requirement.

3.5.2.2 Setpoint Object

F-MPM200 can monitor 27 kinds of parameters, as below:

Object	Parameter
Voltage	Va, Vb, Vc, neutral voltage, average phase voltage, Vab, Vbc, Vca, average line voltage
Current	Ia, Ib, Ic, neutral current, average current
Power factor	PFa, PFb, PFc, PFtot
Frequency	Frequency
Power quality	Voltage unbalance, Phase A voltage THD Phase B voltage THD Phase C voltage THD Phase A current THD Phase B current THD Phase C current THD
Null	No object

3.5.2.3 Set over/ under limit

After set the monitoring object, users need to set the alarm condition.

For example,monitoring A phase voltage,set the over limmit is 120,the setpoint channel will be activated once A phase voltage over 120%Ue;

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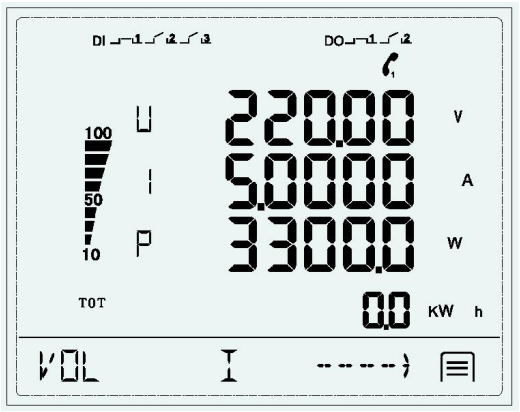
Another example,monitoring the Power Factor of B phase,set the under limit is 80，the setpoint channel will be activated once the B phase Power Factor lower than 80% of rated (rating power factor=1)

Note: When setting the over/ under limit, if the limit value is out of measuring range, the setting will be invalid.

Take the frequency for example:

Measuring range for frequency: 45-65Hz Setpoint limit range: 0-120% (0-60hz), if set the under limit is 20 (20%),the setpoint channel will be not activated because the minimum frequency is 45Hz，which is higher than the setpoint.



3.5.2.4 Set the delay time

After set the over/ under limit, users need to set the delay time. Setting range: 0~99s. Only it satisfy two conditions that, the monitored object over/ under limit and lasting to delay time, will the setpoint channel be activated. If set the delay time to 0, it means setpoint channel will be activated once the object over/ under limit.

3.5.2.5 Alarm Output

When the setpoint channel of one relay output is activated, the relay will output signal. One SOE event is record.

3.5.2.6 Example

Users want to monitor phase A voltage and set the over-limit to 120%Ue, linking with relay 1, set the delay time to 30s. If the actual phase A voltage exceed to the limit and lasting to 30s, then the relay 1 will output the signal. If the phase A voltage return to limit value within 30s, the relay 1 will not respond.

Note
1. If set the delay time to 0, it means setpoint channel will be activated once the object over/ under limit. 2. If no setting the monitor object, it means no relay alarm function.

Chapter 4 Display&Operation

4.1 Show Overview

F-MPM200 has a large-screen, backlit LCD liquid crystal display, through 4 buttons, in conjunction with the menu prompt, to achieve multi-function menu switching function. If there is no key operation within 60s, the backlight will automatically turn off, and the backlight will not turn on again until there is a key operation.

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4.2 Button Function

Introduction

- - - ->：Menu scroll to find；

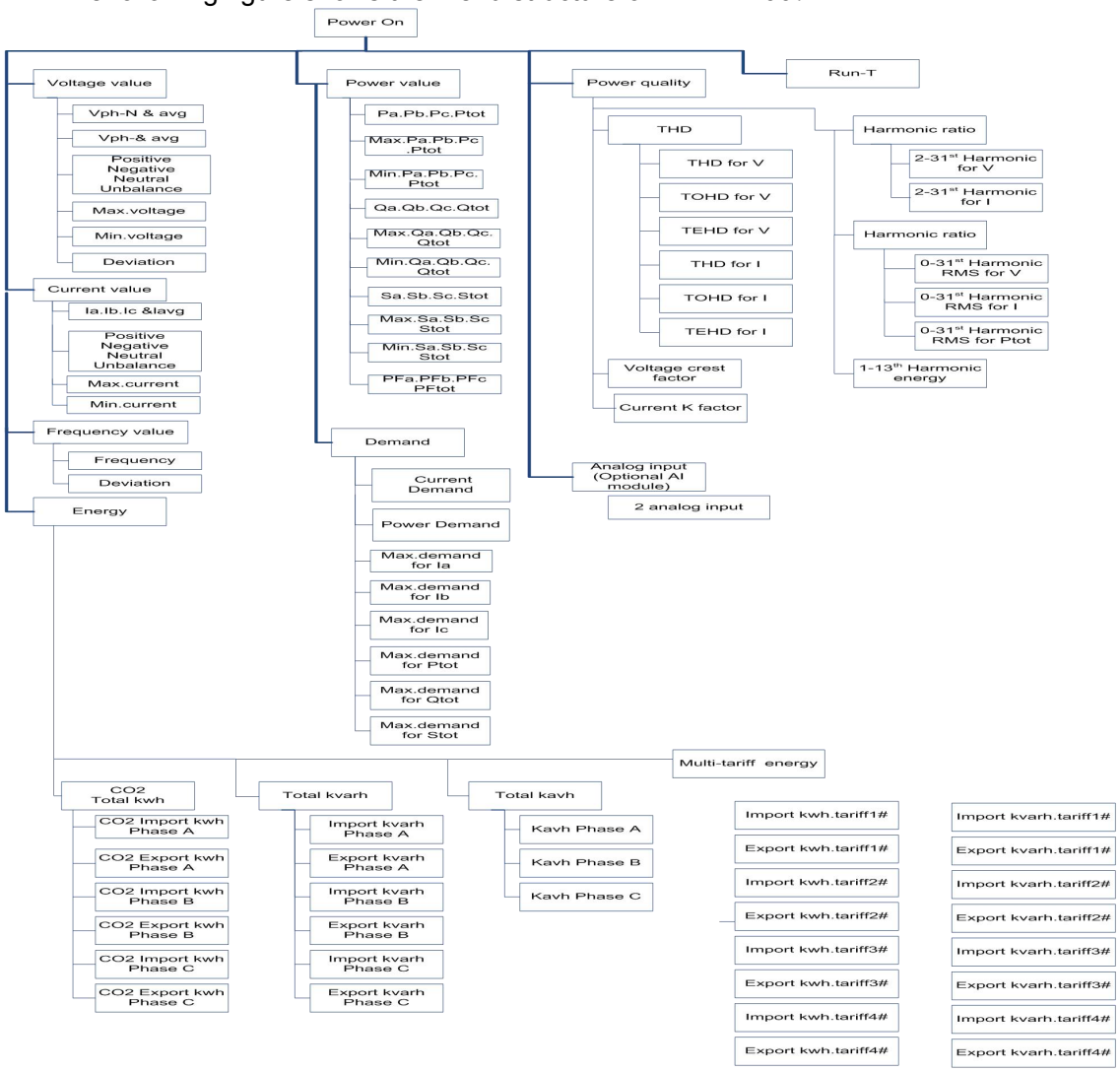
：Return to the upper menu；

SET：setting menu；

Ordinary prompt：Enter the menu page corresponding to the prompt.

4.3 Data Query

The following figure shows the menu structure of F-MPM200：



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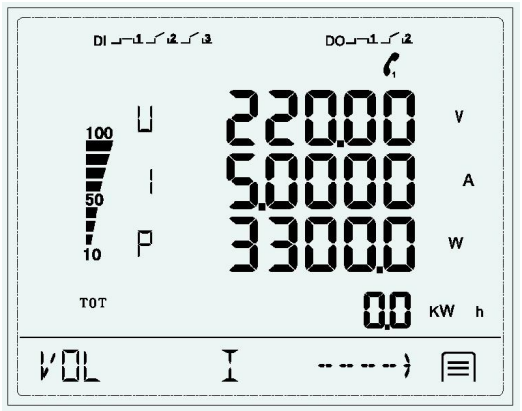
4.3.1 Power-on display interface

Data Display:
The average voltage is displayed from top to bottom (4Y type connection
Under the line is the average phase voltage, under the 3d type wiring is the average
Line voltage), average current, total active power, total
Active electrical energy. (As shown in Figure 1)

Key tips:
VOL: Voltage menu
I: Current menu
FRE: Frequency menu
POWER: Power menu
ENRGY: Energy category menu
EQ: power quality menu
DMD: Demand menu
A-I: Analog input menu
SET: instrument setting menu



1 图

4.3.2 Voltage Display Interface

Data Display:
From top to bottom, the phase A voltage, phase B voltage,
Phase C voltage and average phase voltage. (As shown in Figure 1)
Key tips:
L-N: Three-phase phase voltage & average phase voltage menu
L-L: Three-phase line voltage & average line voltage menu
UNBAL: positive sequence (U-2), negative sequence (U-1), zero
Sequence voltage (U-0) & voltage unbalance rate

Note: When the configuration is N, positive sequence (U-2), negative sequence (U-1),
Zero sequence voltage (U-0) is not calculated and displayed as 0.
MAX: Three-phase phase voltage/line voltage maximum record menu
(Figure 2 shows the maximum voltage of phase A)
MIN: Three-phase phase voltage/line voltage minimum record menu
REC: Voltage deviation record menu (specific instructions are as follows)

Data Display:
The number in the menu title indicates the

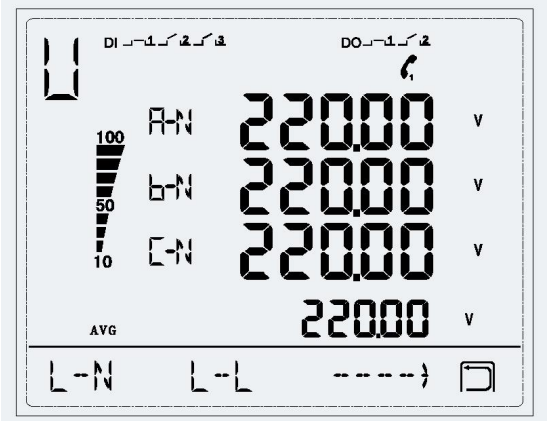


Figure**1**

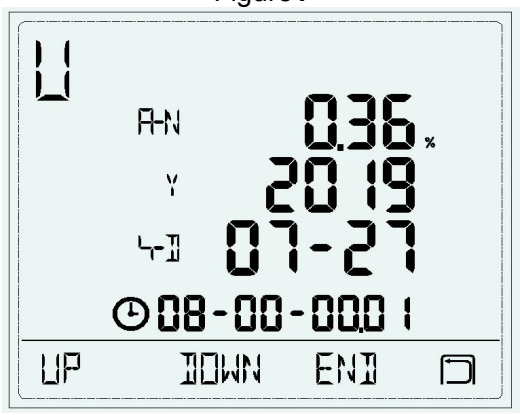


Figure**2**

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current record. From top to bottom, it displays the voltage deviation value of the record, the record start/end year, the record start/end month and day, and the record start/end time (press the "START" button to display the start time, press the "END"

Key tips:
UP: Next record
DOWN: Last record
START/END: Record start/end time switch

Special note: the number on the right side of the clock
08-00-00.01 respectively represent hour, minute, second, and the number after the decimal point is the current record

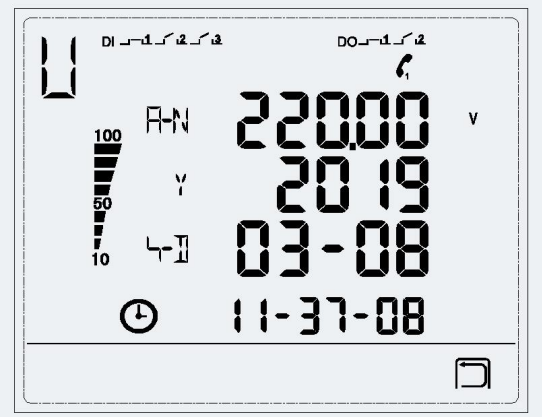

Figure **3**

4.3.3 Current Display Interface

Data Display:
From top to bottom, the A-phase current, B-phase current,
Phase C current and average current. (As shown in Figure 1)
Key tips:
I-0: Zero sequence current (I-0)
MAX: Three-phase current maximum record menu
MIN: Three-phase current minimum record menu

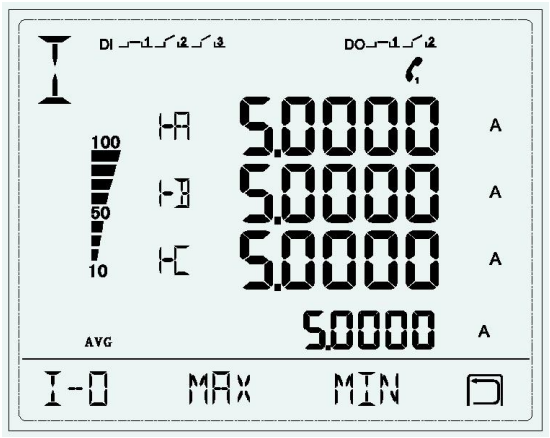

Figure 1

4.3.4 Frequency Display Interface

Data Display:
Real-time frequency value. (As shown in Figure 1)
Key tips:
REC: Frequency deviation recording menu (menu display and 8.3.2
The medium voltage deviation record menu is similar) (as shown in Figure 2)

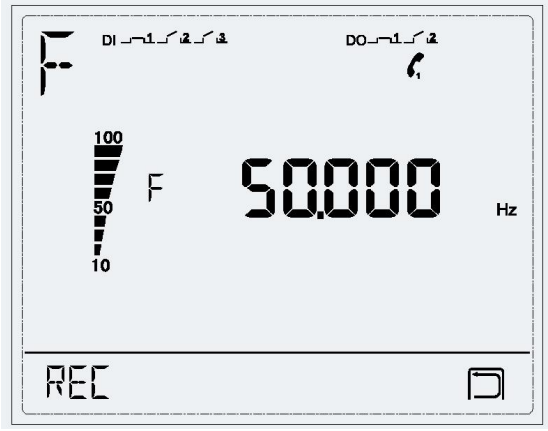

Figure 1

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4.3.5 Power Display Interface

Data Display:

Power display menu. (As shown in Figure 1)

Key tips:

P: Three-phase active power & total active power menu (As shown in Figure 2)

Q: Three-phase reactive power & total reactive power menu (As shown in Figure 3)

S: Three-phase apparent power & total apparent power menu

PF: Three-phase power factor & total power factor menu

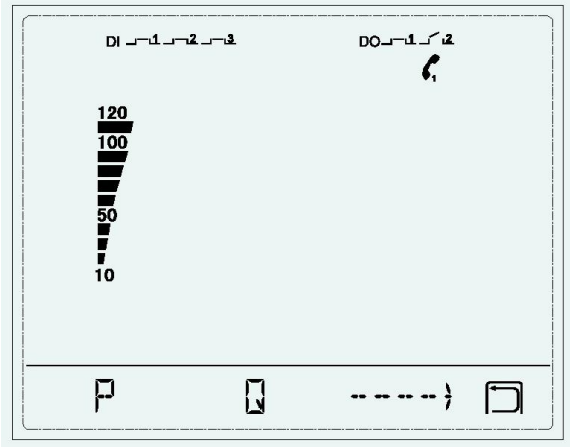

Figure 1

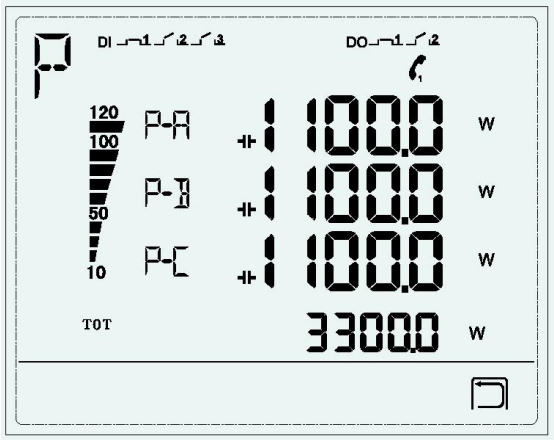

Figure 2

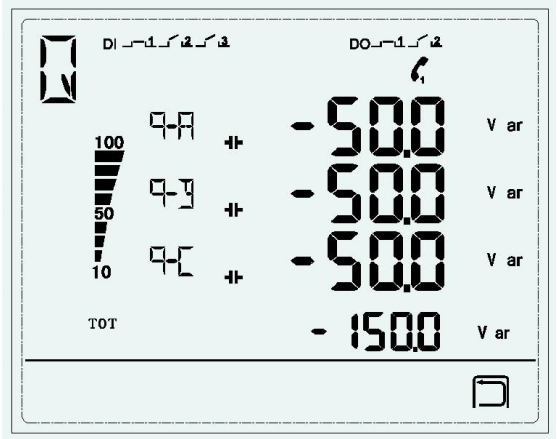

Figure 3

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4.3.6 Electric Energy Display Interface

Data Display:
Total active energy. (As shown in Figure 1)
Key tips:
kWh: Active energy menu (including total active power, A-phase input active power, A-phase output active power, B-phase input active power, B-phase output active power, C-phase input active power, and C-phase output active power) (as shown in Figure 2 for phase A Input active energy)

kvarh: reactive energy menu (including total reactive power,
A-phase input reactive power, A-phase output reactive power, B-phase input reactive power, B-phase output reactive power, C-phase input reactive power, C-phase output reactive power) (As shown in Figure 3, phase A input reactive energy)

TOU: Multi-rate electric energy menu (including
1# rate input active power, 1# rate output active power,
2# rate input active power, 2# rate output active power,
3# rate input active power, 3# rate output active power,
4# rate input active power, 4# rate output active power,
1# rate input reactive power, 1# rate output reactive power,
2# rate input reactive power, 2# rate output reactive power,
3# rate input reactive power, 3# rate output reactive power,
4# rate input reactive power, 4# rate output reactive power)
(As shown in Figure 4, 1# rate input active energy)

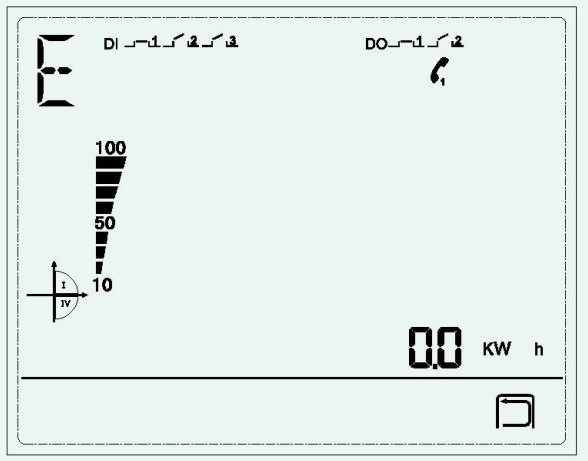

Figure 1

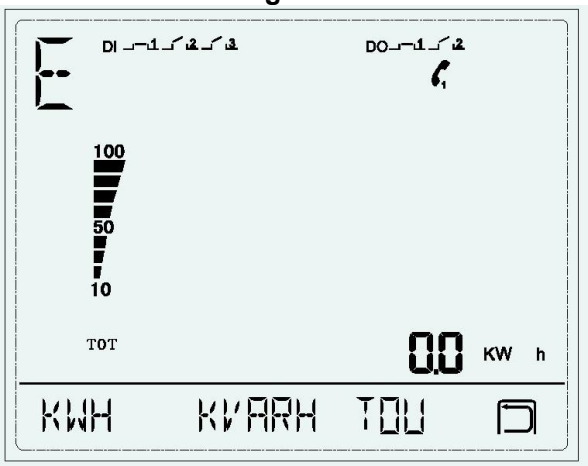

Figure 2

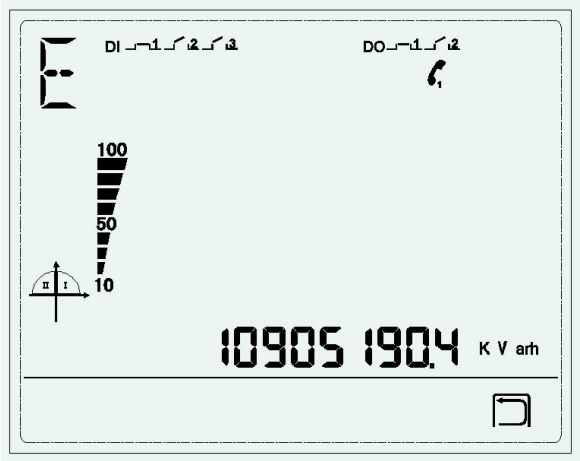

Figure 3

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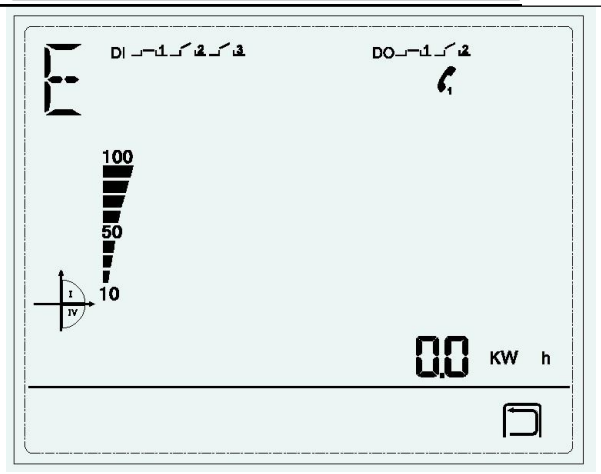

Figure 4

4.3.7 Power Quality Display Interface

Data Display:
none. (As shown in Figure 1)
Key tips:
THD: Harmonic distortion rate menu (including voltage and current total harmonic distortion rate (THD), voltage and current total even harmonic distortion rate (TEHD), voltage and current total odd harmonic distortion rate (TOHD)) (see figure 2 shows the voltage total harmonic distortion rate)

HR: Harmonic content rate menu (including three-phase voltage 2~31st harmonic content rate, three-phase current 2~31st harmonic content rate) (Figure 3 shows the voltage 2nd harmonic content rate)
RMS: Harmonic effective value menu (including 0~31st three-phase harmonic voltage effective value, 0~31st three-phase harmonic current effective value, 0~31st harmonic total active power effective value) (as shown in Figure 4) Effective value of three-phase voltage DC component)

CF: Voltage crest factor (as shown in Figure 5)
K-FAC: Current K factor (as shown in Figure 6)
ENRGY: 1~13th harmonic total active energy (as shown in Figure 7 is the fundamental total active energy)

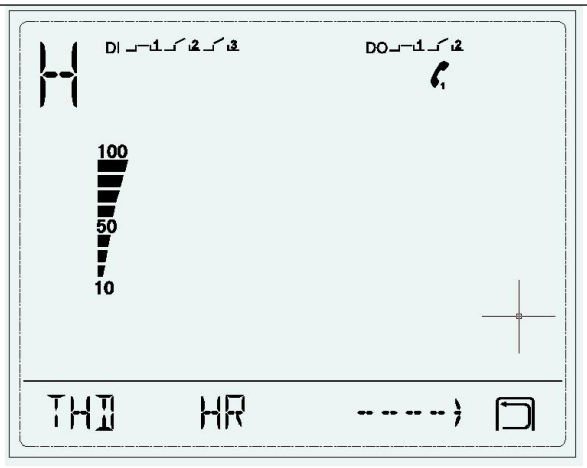

Figure 1

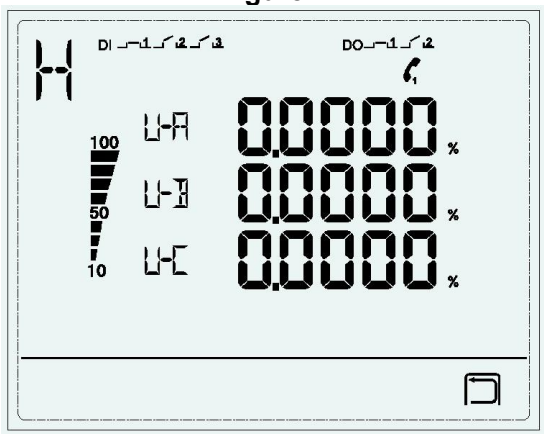

Figure 2

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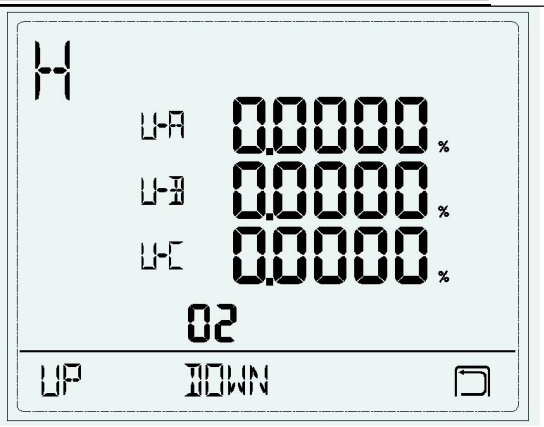

Figure 3

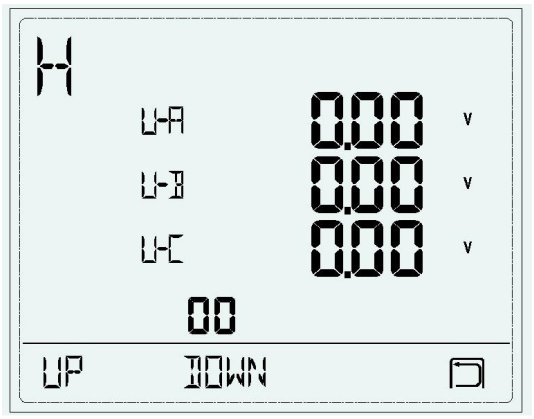

Figure 4

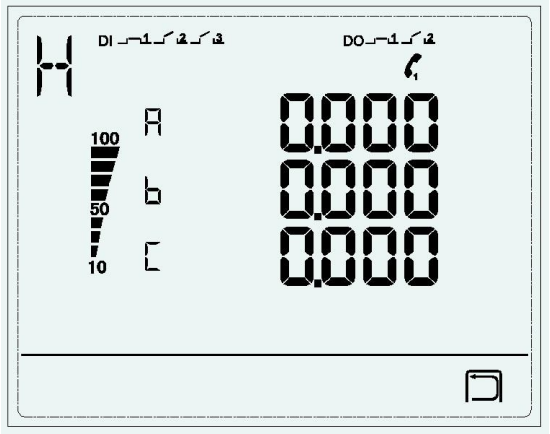

Figure 5

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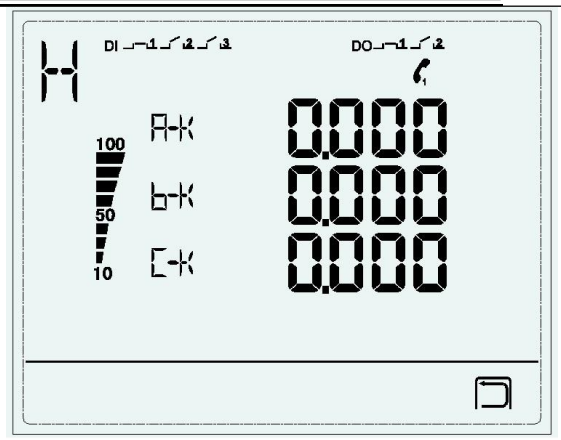

Figure 6

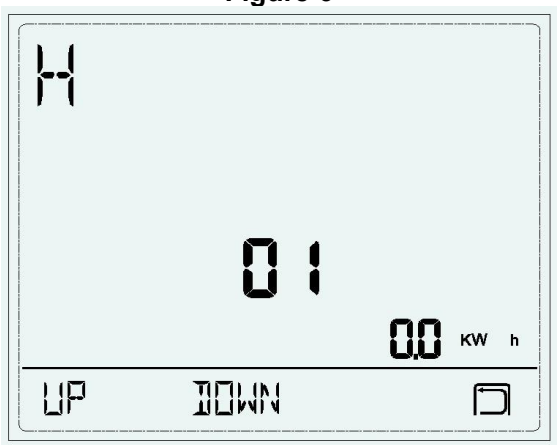

Figure 7

4.3.8 Demand Display Interface

Data Display:
none. (As shown in Figure 1)
Key tips:
IA: Record of maximum demand for phase A current (including maximum demand value and time) (as shown in Figure 2)
IB: B-phase current maximum demand record (including maximum demand value and time)
IC: C-phase current maximum demand record (including maximum demand value and time)
P: Total active power maximum demand record (including maximum demand value and time)

Q: Record of maximum demand of total reactive power (including maximum demand value and time)
S: Total apparent power maximum demand record (including maximum demand value and time)

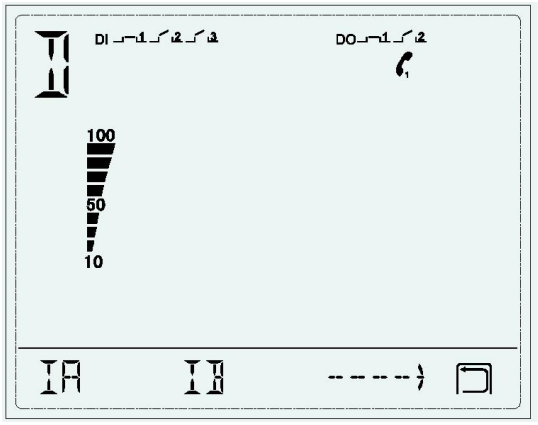

Figure 1

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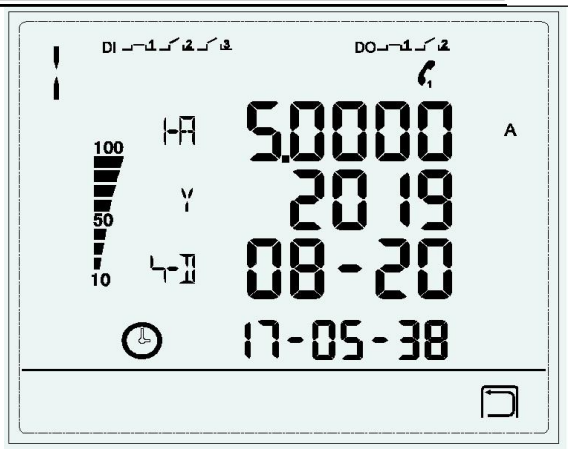

Figure 2

4.3.9 Analog Input Type Display Interface

Data Display:
From top to bottom, it is the first analog input and the second analog input. (As shown in Figure 1)
Key tips:
no

Note: This page is only available when the analog input expansion module is connected

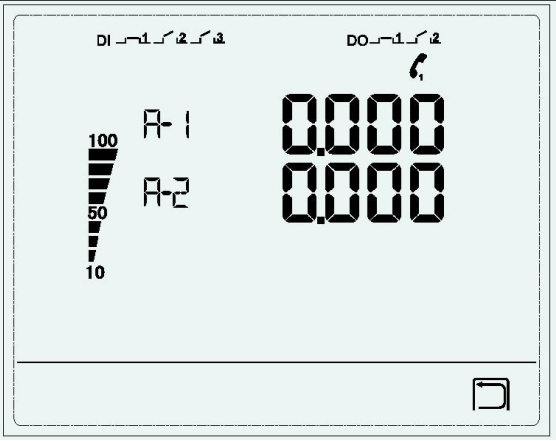

Figure 1

4.3.10 Setting Display Interface

Data Display:
no. (As shown in Figure 1)
Key tips:
METER: Basic settings
COM: communication settings
CLEAR: Clear operation
RELAY: Relay setting
AO: Analog output setting
LIMIT: deviation limit setting
ERROR: Error record
AI: Analog input setting

Key operation instructions:
Enter the parameter setting interface, if the parameter can be set currently, the key prompt will display the words "CODE" (password is not

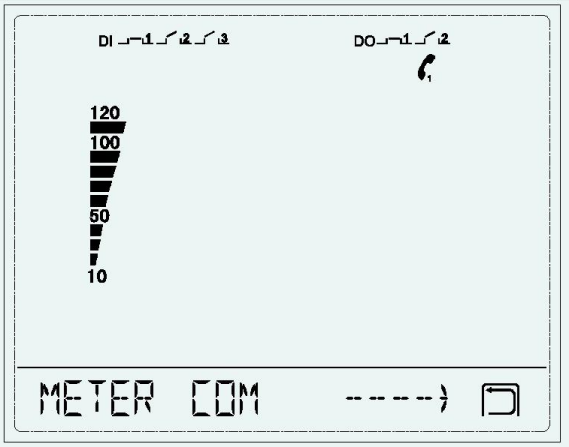

Figure 1

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verified) or "EDIT" (password verification), as shown in Figure 2 on the left; there is no "CODE" word , As shown in Figure 3. Password verification, only input the correct password to set the parameters, press the button corresponding to the word "CODE", the display shows "0000", the button prompt changes to "UP" (the cursor position number plus 1), LEFT (the cursor left Move 1 digit), ENTER (confirm), (abandon input), enter the correct password, the factory default password is 0001, and the super password is 2011. After entering the correct password, press the prompt to display "EDIT", press the key corresponding to this character Set the parameters; otherwise, return to the interface before entering the password. (As shown in Figure 4)

Parameter setting, after the password verification is passed, press the key corresponding to the "EDIT" character, and the current setting item will start to flash, according to the key prompt "UP" (the cursor position number plus 1), LEFT (the cursor moves to the left by 1), ENTER (Confirm), (abandon input) to set the parameters, as shown in Figure 5. If the input parameters

If it is illegal, the original parameter will be restored after pressing "ENTER"; if the input parameter is legal, the changed parameter will be displayed.

Note:
"Analog output setting" is only available when an analog output module is connected
"Analog input setting" is only available when an analog input module is connected

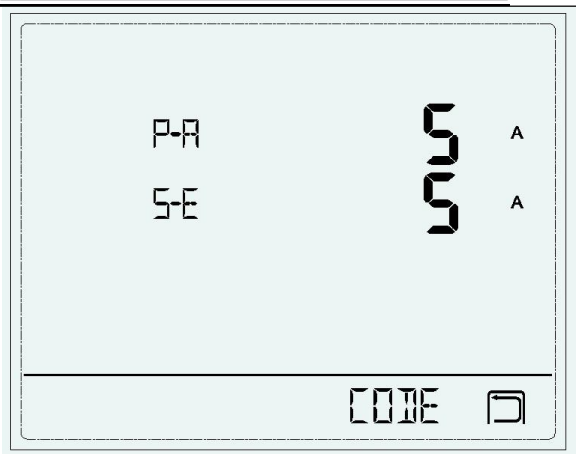

Figure 2

Figure 3

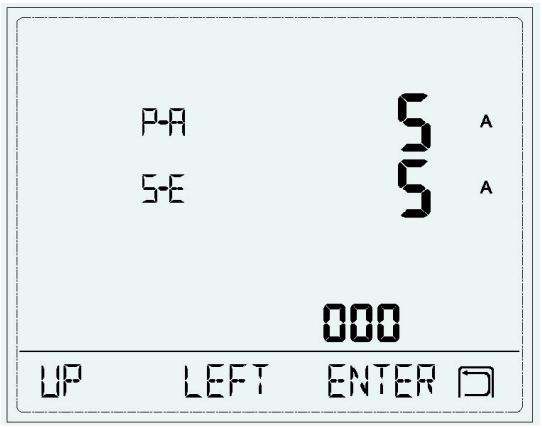

Figure 4

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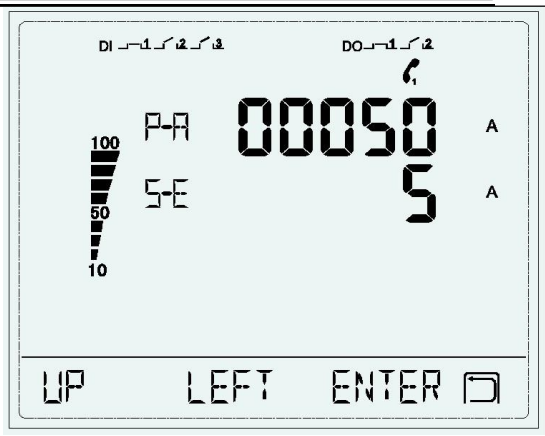

Figure 5

4.3.10.1 Basic Setting Display Interface of The Instrument

Key tips:
INFO: Instrument information
EX-M: Expansion module information
PT: PT primary side value setting
CT: CT primary side value setting
MODE: Wiring mode

DATE: system date
TIME: system time

DMD: Demand setting
PULSE: Pulse output setting*
DEFAU: Restore factory settings

CODE: Password setting
CALIB: automatic calibration
CHECK: Self-check
DEMO: Debug mode
UL1: Phase sequence adjustment channel 1 V-I pairing setting
UL2: Phase sequence adjustment channel 2 V-I pairing setting
UL3: Phase sequence adjustment channel 3 V -I pairing setting
Parameter setting description:
Enter the INFO (instrument information) page, which displays the software version (V-S), hardware version (V-H), and serial number (SN). This page can only be viewed but cannot be modified.
Enter the EX-M (expansion module information) page, and display the expansion module types from top to bottom: nuLL (no expansion), rS485 (communication expansion module), PULSE (pulse output expansion module), DI (switch input expansion module) , DO (relay output expansion

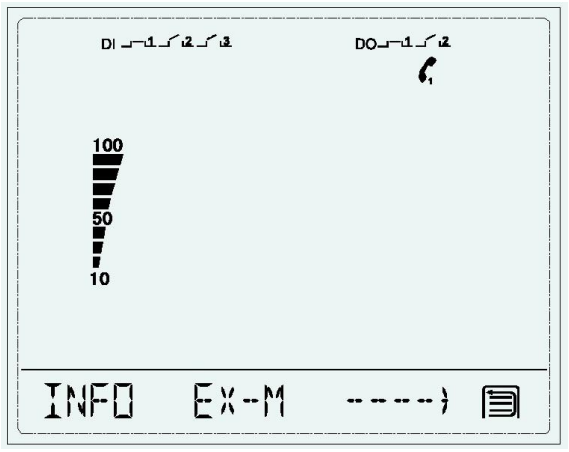

图 1

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module), AI (analog input expansion module), AO (analog output expansion module). This page can only be viewed and cannot be modified.

Enter the PT (PT primary side setting) page, the first line displays the PT primary side value in kV, and the second line displays the system rated voltage value in V. The setting range of the PT primary side is 0.1kV~65kV, and the primary side value must not be less than the system rated value.

Enter the CT (CT primary side setting) page, the first line displays the CT primary side value in A, and the second line displays the system rated current value in A. The setting range of CT primary side is 1A~9999A, and the primary side value must not be less than the system rated value.

Enter the MODE (wiring mode) page, the second line displays the current wiring mode.

Wiring mode	4y	Three-phase four-wire
	3d	Three-phase three-wire

Enter the DATE (system date) page, the first line displays "year", the second line displays "month", and the third line displays "day". The setting sequence is "year", "month" and "day". Only after the previous item is set correctly can the next item be set, otherwise it will stay at the previous item. The setting range of "Year" is 2000~2099, the setting range of "Month" is 1-12, and the range of "Day" is 1~31. If there is no 31st in the current month, it will automatically change to the 1st of the next month.

Enter the TIME (system time) page, the first line displays "hour", the second line displays "minutes", the third line displays "seconds". The setting sequence is "hour", "minute", "second", only the first After one item is set correctly, the next item can be set, otherwise it will stay at the previous item. The setting range of “hour” is 0~23, the setting range of “minute” is 0~59, and the range of “second” is 0~59.

Enter the DMD (demand setting) page, if the current demand mode is slip mode, the button prompts are "TYPE" (demand mode), "PERIO" (demand period) and "SLIP" (slip time) ; If the current mode is fixed mode, there is no "SLIP" (slip time) item.

Demand mode	STAC	Fixed mode
	SLIP	Slip mode

Enter the PULSE (pulse setting) page, you can set "PUL-1" (the first pulse) and "PUL-2" (the second pulse). "OBJ" is the pulse object (the first channel is fixed as active and the second channel is fixed as

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reactive), "CONST" is the pulse constant, and "WIDTH" is the pulse width (unit: ms).

category	default	Setting range
CONST	1000	1000~9999
WIDTH	80	60~100

Enter the DEFAU (restore factory settings) page, set to "YES" to restore the meter to the factory settings: restore default parameters, clear all energy and records.

Enter the CODE (password setting) page, you can reset the verification password (the super password will not be changed), and the password setting range is 1~9999.

Enter the CALIB (automatic calibration) menu page. In order to prevent user misoperation, this function is not open to users.

Enter the CHECK (self-check) page, select "YES", the meter will start the self-test, the meter will check the LCD, ferroelectric, and keys in sequence: LCD self-test: LCD will be fully displayed and maintained for 4s, then all off and maintained for 2s ;Ferroelectric self-test: if the ferroelectricity is normal, the word "HArdPASS" will be displayed; otherwise, the word "HArd FAIL" will be displayed; key-press self-test: the screen will prompt to press "F1", "F2", "F3", "F4", press the correct button, the word "PASS" will be displayed; if the button is incorrect or there is no button for 15 seconds, the button will be considered incorrect and the word "FAIL" will be displayed; the alarm prompt will not be displayed during the self-test;

Enter the DEMO (DEBUG mode) page, select "YES" to turn on the DEBUG mode: phase voltage is fixed at 220V, line voltage is fixed at 381.05V, current is fixed at 5A, active power is 1100W, total active power is 3300W, and reactive power is -500var, total reactive power is -1500var, apparent power is 1100VA, total apparent power is 3300VA, power factor is -0.5, total power factor is -0.5.

Enter the DEMO (DEBUG mode) page, select "no" to close the DEBUG mode, and the display will return to normal.

*Note: Only when there is a pulse output expansion module,
Only PULSE (pulse setting) page is available.

4.3.10.2 Communication Setting Display Interface

Key tips:
M1ADD: No. 1 Modbus communication address
M1BAU: The first Modbus communication baud

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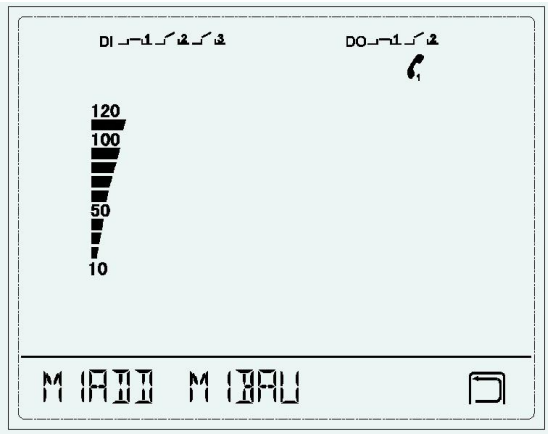
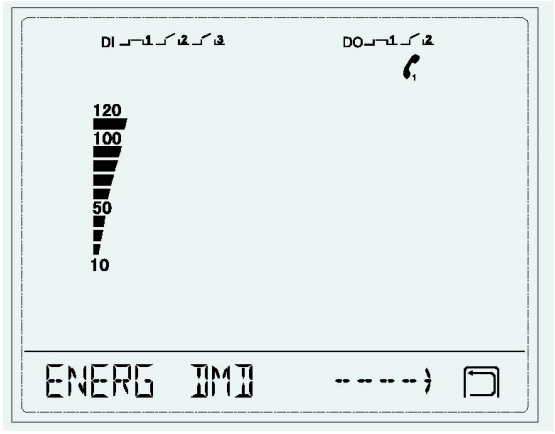
rate M2ADD: Channel 2 Modbus communication address* M2BAU: Modbus communication baud rate of the second channel* Parameter setting description: Enter the M1ADD (the 1st Modbus communication address) page to display the 1st instrument communication address. The communication address of the instrument can be set in the range of 1~247. Enter the M1BAU (the first Modbus communication baud rate) page, and display the first communication baud rate of the instrument. The range of communication baud rate of the instrument is 2400, 4800, 9600, 19200, 38400. Enter the M2ADD (Modbus communication address No. 2) page, and display the communication address of the No. 2 instrument. The communication address of the instrument can be set in the range of 1~247. Enter the M2BAU (the second Modbus communication baud rate) page to display the second communication baud rate of the instrument. The range of communication baud rate of the instrument is 2400, 4800, 9600, 19200, 38400. *Note: Only in the case of Modbus expansion module, Only the M2ADD (channel 2 Modbus communication address) page and the M2BAU (channel 2 Modbus communication baud rate) page are available.	 **Figure 1**

4.3.10.3 Clear Setting Display Interface

Key tips: ENERG: Electric energy removal DMD: demand removal MX/MN: maximum/minimum clear REC: Clear deviation record SOE: SOE record clear Parameter setting description: Enter the ENERG page and set it to "Yes" to clear all energy records. Enter the DMD (demand removal) page and set it to "Yes" to clear the real-time demand value and the maximum demand record, and the demand will restart statistics from the current moment. Enter the MX/MN (maximum/minimum value clear) page, and set it to "Yes" to clear the maximum/minimum value records of the real-time measurement volume, and start statistics from the current moment.	 **Figure 1**

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Enter the REC (clearance of deviation over-limit record) page and set it to "Yes" to clear the frequency deviation over-limit record, voltage deviation over-limit record, and voltage unbalance rate over-limit record. Enter the SOE (SOE record clear) page, and set it to "Yes" to clear all SOE records.	

4.3.10.4 Relay Setting Display Interface

Key prompt (as shown in Figure 1):
R1: No. 1 relay setting
R2: No. 2 relay setting
R3: No. 3 relay setting*
R4: No. 4 relay setting*
There is MODE in each relay setting.
Type), HIGH (relay upper limit), LOW (relay lower limit), OBJ (relay object), DELAY (relay delay time), BACK (relay return time). Such as

As shown in Figure 2.
The menu display is different in different relay modes,
As shown in the following table:
Relay mode Display menu

Relay mode	Show menu
Lo（Local mode）	MODE、HIGH、LOW、OBJ、DELAY
rE（Remote mode）	MODE、BACK

Parameter setting description:
Enter the MODE (relay mode) page, display the current relay mode, "Lo" is the local mode, and "rE" is the remote mode.
Enter the HIGH (relay upper limit) page to display the current upper limit of the relay. The setting range is 0%~120%, and the upper limit set must not be less than the current lower limit of the relay.
Enter the LOW (relay lower limit) page, display the current lower limit of the relay, the setting range is 0%~120%,
At the same time, the lower limit value set must not be greater than the current upper limit value of the

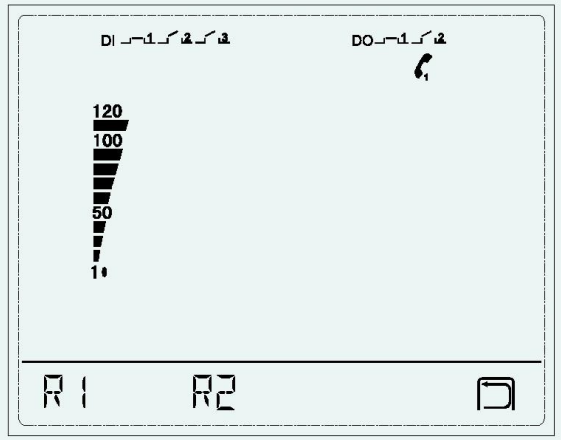

Figure 1

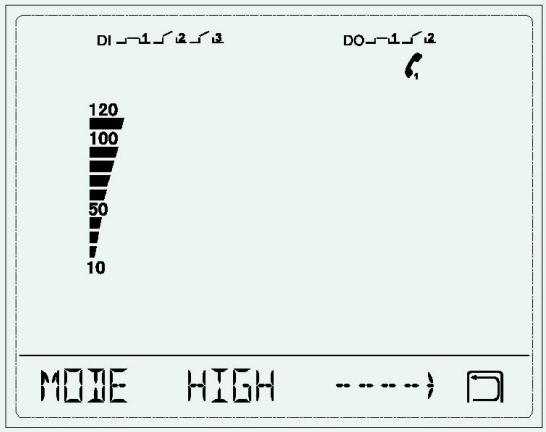

Figure 2

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relay.
Enter the OBJ (relay object) page to display the current relay object. The relay object settings are shown in the following table:

symbol	name
null	None
F	frequency
U1 A	A Phase voltage
U2 B	B Phase voltage
U3 C	C Phase voltage
U0	Zero sequence voltage
UnA	Average phase voltage
U12	AB line voltage
U23	BC line voltage
U31	CA line voltage
ULA	Average line voltage
A1	A Phase current
A2	B Phase current
A3	C Phase current
A0	Zero sequence current
IAvg	Average current
PF1	A Phase power factor
PF2	B Phase power factor
PF3	C Phase power factor
PFtot	Total power factor
UnbU	Voltage unbalance rate
THdU1	A Phase voltage total harmonic distortion rate
THdU2	B Phase voltage total harmonic distortion rate
THdU3	C Phase voltage total harmonic distortion rate

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THdA1	A Total harmonic distortion rate of phase current
THdA2	B Total harmonic distortion rate of phase current
THdA3	C Total harmonic distortion rate of phase current

Enter the DELAY (relay delay time) page, display the current relay delay time, and the setting range is 0~99s.

Enter the BACK (relay reset time) page, display the current relay reset time, the setting range is 0~99s.

*Note: Only when there is a relay expansion module,

Only R3 (the 3rd relay setting) page and R4 (the 4th relay setting) page are available.

4.3.10.5 Analog Output Setting Display Interface

Key prompt (as shown in Figure 1):
AO1: the first analog output setting
AO2: the second analog output setting
There is OBJ (analog output
Out target), RATES (analog quantity amplification factor), OUT (analog quantity output calibration coefficient). (as shown in picture 2)
Parameter setting description:

Enter the OBJ (analog output object) page, display the current analog output object, the settings are shown in the following table:

symbol	name
null	Null
U1	A Phase voltage
U2	B Phase voltage
U3	C Phase voltage
U12	AB Line voltage
U23	BC Line voltage
U31	CA Line voltage
A1	A Phase current

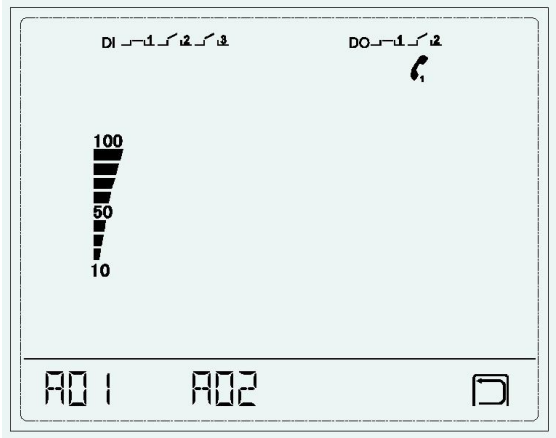

图 1

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A2	B Phase current
A3	C Phase current
P	Total Active Power
q	Total Reactive Power
PF	Total Power Factor
F	Frequency

Enter the RATES (analog magnification) page, display the current analog magnification, and the analog magnification setting range is 1.0~10.0. Enter the OUT (analog output calibration coefficient) page to display the current analog output calibration coefficient. The analog output calibration coefficient setting range is: 1~65535.

4.3.10.6 Deviation Limit Setting Display Interface

Key tips:
F: Frequency deviation limit setting
VOL: Voltage deviation limit setting
UNBAL: Voltage unbalance rate limit setting
Parameter setting description:
Enter F (frequency deviation limit setting) page, display the current frequency deviation limit, the frequency deviation setting range is 0~10Hz.
Enter the VOL (Voltage Deviation Limit Setting) page to display the current voltage deviation limit. The voltage deviation setting range is 0%~100%.
Enter the UNBAL (voltage unbalance rate limit setting) page, display the current voltage unbalance rate limit, the setting range is 0%~100%.

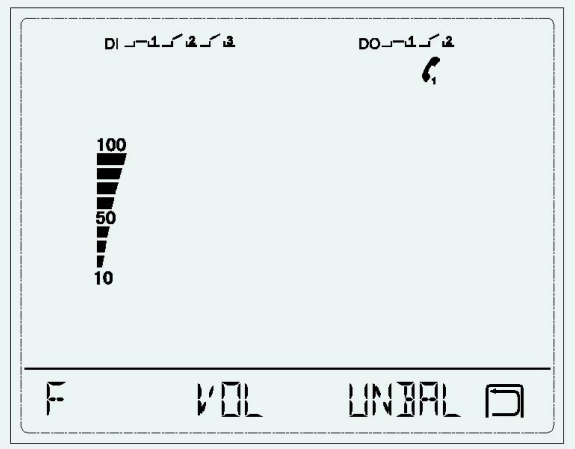

Figure 1

4.3.10.7 Error Log Display Interface

Key tips:
1: Non-volatile storage read error
2: Non-volatile storage write error
3: Read error of volatile storage
4: Write error in volatile storage
5: Sampling error
6: Communication error

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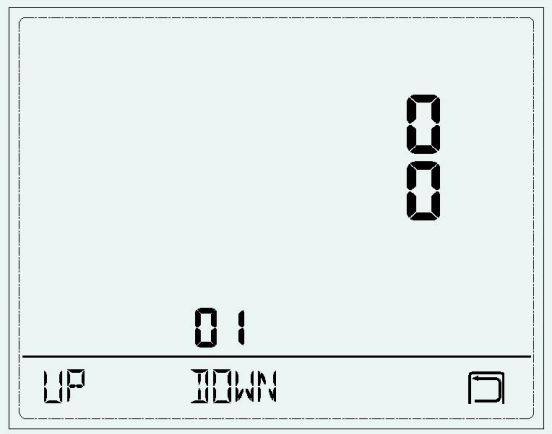
7: Calculation error

The data on this page can only be viewed, not set.

Enter various error interface, press "UP" key to view
One record, "DOWN" to view the previous record, each type
Errors can record the time of the last 10 occurrences.
When any type of error occurs, the alarm on the interface
The indicator will light up. In this case, please contact our technical consultants in time to eliminate the error.

Figure 1



4.3.10.8 Analog Input Setting Display Interface

Enter the AI (analog input calibration coefficient) page, display
Shows the current analog input calibration coefficient, analog input calibration
The coefficient setting range is: 1~65535.
1: Analog quantity 1 input calibration coefficient
2: Analog quantity 2 input calibration coefficient

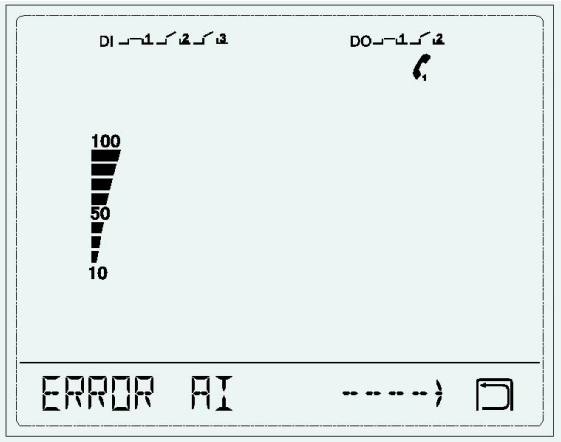


Figure 1

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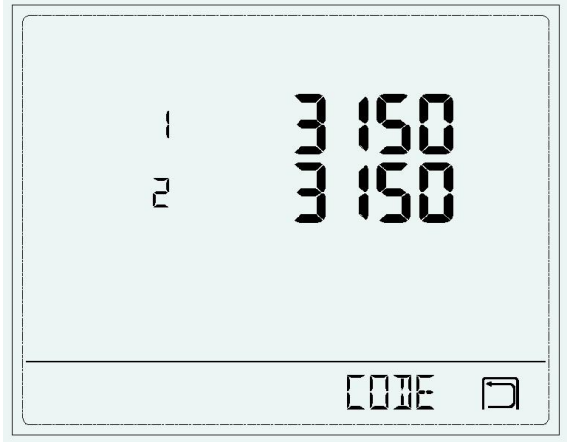

Figure 2

4.4 In-place Programming

The parameter setting of F-MPM200 can be modified through the display prompt, but it is limited to basic parameters and more functional parameters
The setting needs to be completed through the communication interface.

4.4.1 View of Setting Parameters

After pressing the SET key to enter the programming interface, the operation method is as described in 8.3.

4.4.2 Modification of Setting Parameters

Enter the programming interface, and only after entering the correct password can the parameters be modified. In the interface to modify the parameters
Press the "CODE" key and enter the operation password. The factory default password of F-MPM200 is 1. The operation is as described in section 8.3.

■ Instrument address

This menu is used to specify the communication address of the device, F-MPM200 supports MODBUS communication protocol, and the effective address range
1～247.

■ Serial communication rate

F-MPM200 can support up to two communication serial ports, independent of each other. The serial communication rate can support 2400, 4800,
9600, 19200, 38400Bps.

■ PT primary side

In order to ensure that F-MPM200 measures and displays voltage data correctly, the correct PT primary side parameters must be set, and the parameters must be
Must not be less than the rated voltage parameter of the instrument (ie, PT secondary side value). If PT is not used externally, the primary side of PT is set to
Table rated voltage. When the instrument's rated parameters are configured as a low-voltage meter, the PT primary value cannot be set.
The value range of PT primary side is from 0.1kV to 65kV.

■CT primary side

To ensure that the F-MPM200 measures and displays the current data correctly, the

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correct CT primary side parameters must be set.
Must be no less than the rated current parameter of the instrument (ie CT secondary side value).
The value range of CT primary side is from 1A to 9999A.

■Measurement mode

F-MPM200 can correctly measure the power of each phase and other parameters, and it needs to set the correct measurement mode. Currently
F-MPM200 supports four-wire star and delta measurement modes. Refer to section 2.3 for details about wiring method.

The classification of instrument rated parameters is shown in the following table:

High pressure meter	3x220/380V ， 5A
	3x220/380V ， 1A
	3x120/208V ， 5A
	3x120/208V ， 1A
Low pressure meter	3x240/415V ， 1A
	3x277/480V ， 5A
	3x277/480V ， 1A
	3x398/690V ， 5A
	3x57.7/100V ， 5A
	3x57.7/100V ， 1A
	3x63.5/110V ， 5A
	3x63.5/110V ， 1A

■Electricity cleaning

In order to facilitate the user to recalculate the electric energy, a clear operation menu is provided. When the selection is confirmed, F-MPM200 internal measurement
The input and output electric energy will all be cleared to zero. If the multi-rate function is supported, its energy metering value will also be cleared.

■Device Information

To facilitate our follow-up service of the product, two menus are provided for querying device configuration information and version information

Chapter 5 Structure, Installation and Interface Definition

5.1 Packing list

Packing box included:

- ✧ F-MPM200 1
- ✧ user manual 1
- ✧ Antenna(SMA male head) 1 (optional)
- ✧ Installation buckle 2
- ✧ Product qualification certificate
- ✧ Product warranty card

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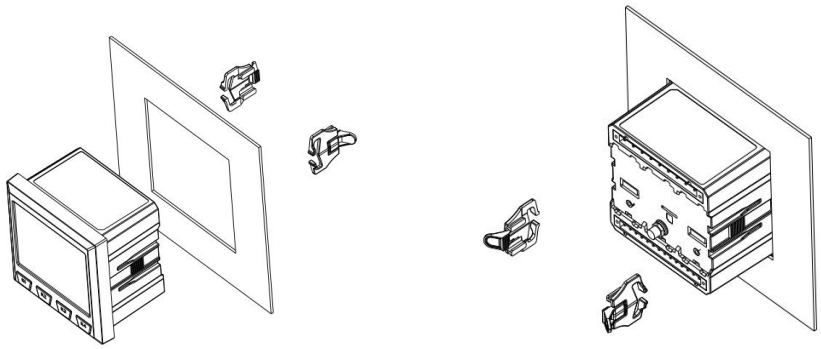
5.2 Installation and wiring definition

F-MPM200 is fixed on the installation screen by 2 fixed sliding blocks.

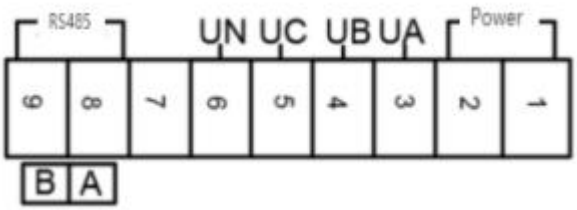
The size of the mounting hole must strictly follow the size marked in the figure below to ensure the correct installation of the equipment.



Hole Size：91*91mm；

depth：52mm（No expansion module）；

Main terminal definition:



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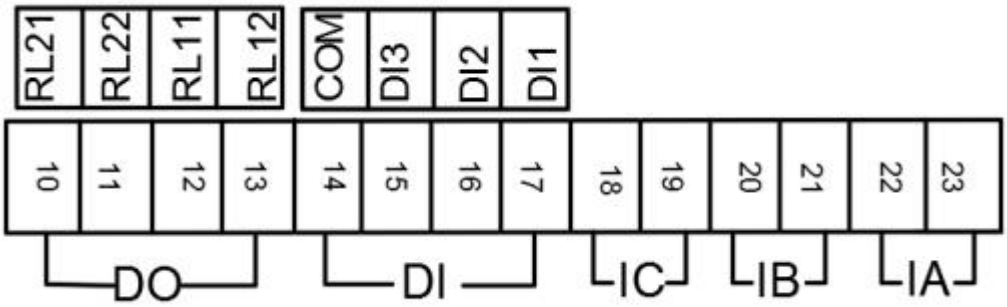
JP1：

No.	Name	definition:
1	L/+	AC power 220V live-wire or DC 220V positive
2	N/-	AC power 220V Neutral-line or DC 220V negative
3	VA	Phase A voltage
4	VB	Phase B voltage
5	VC	Phase C voltage
6	VN	Neutral line (voltage neutral line)
7	SHLD	RS485 shield
8	485+	RS485A
9	485-	RS485B



JP2：

No.	Name	definition:
10	RL21	Relay 2 output 1
11	RL22	Relay 2 output 2
12	RL11	Relay 1 output 1
13	RL12	Relay 1 output 2
14	DG	GND
15	DI3	DI3+

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16	DI2	DI2+
17	DI1	DI1+
18	IC+	C-phase current incoming-line
19	IC-	C-phase current out-line
20	IB+	B-phase current incoming-line
21	IB-	B-phase current out-line
22	IA+	A-phase current incoming-line
23	IA-	A-phase current out-line

Ordering Information

Product model	Description
F-MPM200	Multifunctional power meter
F-MPM200-L	Multifunctional power meter(with 4G module)

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