



PM40 SERIES

Digital Power Meter

User's Guide



SHIHLIN ELECTRIC & ENGINEERING

Safety Warning

Danger
Risk of electric shock, explosion or arcing
<ul style="list-style-type: none"> • Beware of potential hazards, please wear personal protective equipment and comply with electrical operation safety regulations
<ul style="list-style-type: none"> • Installation and maintenance can only be carried out by professional electricians
<ul style="list-style-type: none"> • Never operate alone
<ul style="list-style-type: none"> • Before operation, all power supplies connected to the meter should be turned off
<ul style="list-style-type: none"> • Be sure to use appropriate voltage testing equipment to make sure that all power sources are disconnected
<ul style="list-style-type: none"> • The electrical parameters and auxiliary power input of the meter must be within the rated range of the meter
<ul style="list-style-type: none"> • Do not short-circuit the secondary side of the voltage transformer PT
<ul style="list-style-type: none"> • Do not open circuit on the secondary side of the current transformer CT
<ul style="list-style-type: none"> • Improper polarity of current or voltage input and failure to connect the terminals as required will cause damage to the instrument
<ul style="list-style-type: none"> • Do not touch the terminal when the instrument is working

1. Overview

This series of power meters is an intelligent electrical device used in power systems, and has the measurement and calculation functions of basic AC parameters, such as current, voltage, power, electrical energy, harmonic distortion rate, etc. It also has a variety of intelligent extension functions, such as: switch input DI, relay output DO, analog output AO, etc. It also supports wired RS485 interface, wireless LoRa communication, and ModBus-RTU network communication protocol, which facilitates information exchange with various computer monitoring systems and realizes intelligent digital management.

Features

- (1) With powerful data processing capabilities, real-time monitoring of various electrical parameter information
- (2) The expansion function adopts modular design, which is economical, expandable, convenient and flexible
- (3) Optional LoRa wireless communication to avoid cumbersome wired connection and quick access to intelligent systems
- (4) Self-locking panel type installation mechanism, which can be fixed without screws, easy to install
- (5) The large-size LCD screen displays multiple electrical parameter information in real time, which is intuitive and clear.

▪ Reference Standard

Accuracy test method reference:

- GB/T 17215.321-2008 Alternating Current Measuring Equipment Special Requirements Part 21: Static Active Energy Meter (Class 1 and Class 2) (corresponding to the international standard IEC 62053-21 2016)
- GB/T 17215.323-2008 Alternating Current Measuring Equipment Special Requirements Part 23: Static Reactive Power Meter (Class 2 and Class 3) (corresponding to the international standard IEC 62053-23 2016)

2. Main parameters of product

1 Product model description

Function	Product Type	PM40H	PM40S
Voltage		●	●
Current		●	●
Grid frequency		●	●
Power factor		●	●
Active/reactive power		●	●
Active/reactive electricity		●	●
Four quadrant electricity		●	●
Maximum demand		●	●
Multi-rate statistics		●	●
Total harmonic distortion rate		●	●
Switch input		○ 2 way	—
Relay output		○ 2 way	—
Analog output		○ 2 way	—
Energy pulse output		○ 2 way	—
RS485 communication		○	—
LoRa wireless communication		○	—
LCD		●	●

Note 1: ● Standard configuration, ○ Optional configuration, — No configuration;

Note 2: RS485 communication and LoRa wireless communication can only choose one.

2 Main technical indicators

2.1 Environmental characteristics

Working temperature	-10°C to +60°C
Storage temperature	-30°C to +80°C
Relative humidity	5% to 95% relative humidity at 55°C (no condensation)
Altitude	≤ 2000 meter

2.2 Mechanical properties

Degree of protection	Panel IP52, shell IP20
Panel size	96mm × 96mm
Hole size	91mm × 91mm
Display mode	Segmented LCD screen
Operation keyboard	4 buttons
Weight	< 400g

2.3 Electrical characteristics

2.3.1 Measurement accuracy

Current, voltage	$\pm 0.5\%$
Frequency	$\pm 0.1\text{Hz}$
Active power, active energy	Level 1, in line with GB/T 17215.321
Reactive power, reactive energy	Level 2, in line with GB/T 17215.323

2.3.2 Auxiliary power supply

Rated working voltage range	AC/DC 85V ~ 265V, 50/60Hz
Power consumption	< 5W

2.3.3 Wiring configuration

Grid system	Three-phase four-wire system 3CT, three-phase three-wire system 2CT
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2.3.4 Voltage input

Line voltage rating U_e	100VAC, 400VAC
Line voltage overload	Continuous: $1.2U_e$; instantaneous: $2U_e$, 1min
Extended PT ratio	1 ~ 9999
Power consumption	< 0.5VA per channel

2.3.5 Current input

Current rating I_n	1A, 5A
Current overload	Continuous: $1.2I_n$; instantaneous: $10I_n$, 5s
Extended CT ratio	1 ~ 9999

2.3.6 Accessory module input and output

Power pulse output (PO)	Optocoupler isolation, passive open collector output
	Two-way energy pulse, active and reactive power, pulse constant can be set
Switch input (DI)	Passive dry contact input (no positive and negative poles), optocoupler isolation
	Detect the ON/OFF state of the contact, which can be "remote signal" through communication
Relay output (DO)	Over-limit parameters can be set, alarm output
	You can also "remote control" through communication
	Relay contact capacity: 5A 250VAC / 5A 30VDC
Analog output (AO)	Convert meter measurement parameters into DC current output
	DC 4~20mA, load resistance $\leq 600\Omega$, 1.2 times of overload

2.4 Communication

Communication protocol	ModBus-RTU protocol
Baud rate	1200~38400 bps can be set
Wireless communication method	LoRa communication technology
	Frequency band 433MHz, special frequency band for export needs to be customized

2.5 EMC characteristics

Electrostatic discharge	Air discharge 15kV
Radiation immunity	Test field strength: 10V/m
Fast transient burst immunity	Voltage/current input terminal: 2kV, auxiliary power terminal: 2kV
Surge immunity	Voltage/current input terminal: 4kV, auxiliary power terminal: 1kV
Conducted immunity	Voltage level: 10V

2.6 Safety

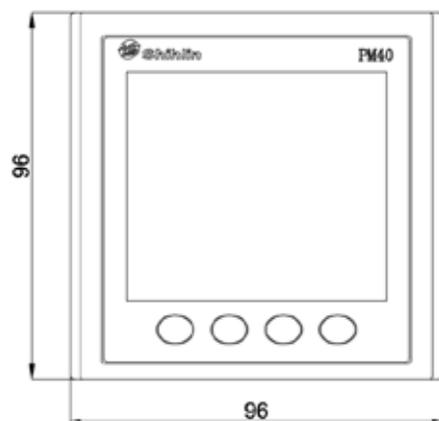
Terminal power frequency Withstand voltage	Shell, power supply, input end, output end > AC 2kV 1min
	Transmission, communication, pulse, switch > AC 1kV 1min
Insulation resistance	Input and output end to shell > 100MΩ

2.7 Expansion accessory module

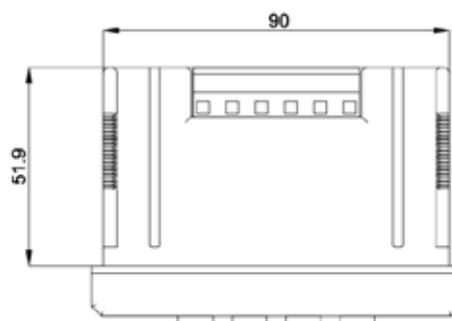
Module	Module corresponding function
M1, M4	485 communication output (C), LoRa communication output (L)
M2	Switch input (DI), relay output (DO)
M3	Analog output (AO), energy pulse output (PO, QO)

3. Installation, wiring and configuration

3.1 Instrument size (unit: mm)



Front view

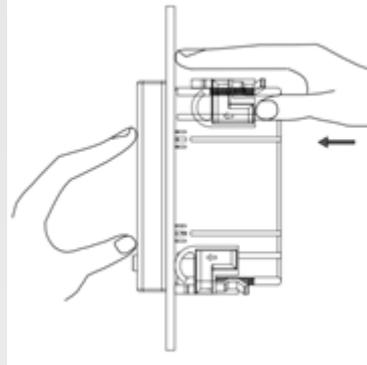


Side view

3.2 Instrument installation



Hole size (unit: mm)



Assembly drawing

It adopts panel installation and is fixed on the switch cabinet panel.

- a. On the switchgear panel, reserve "panel cutout size";
- b. Take out the meter, remove the fixed buckle, and insert the meter into the panel opening;
- c. Insert the fixing buckles from the four corners of the meter and push the buckles until the meter is fixed on the panel.

3.3 Wiring and configuration

Description	Power supply		Voltage input				Current input					
	1	2	3	4	5	6	7	8	9	10	11	12
Terminal number	1	2	3	4	5	6	7	8	9	10	11	12
Name	L	N	V1	V2	V3	VN	I11	I12	I21	I22	I31	I32

Module name	M1 module Or communication module			M2 module Or DIDO module						
	Communication			Switch input			Relay output			
Terminal number	13	14	15	16	17	18	19	20	21	22
Name	A	B	G	DIG	DI1	DI2	DO11	DO12	DO21	DO22

Module name	M3 module Or AO module						
	Energy pulse output				Analog output		
Terminal number	23	24	25	26	27	28	29
Name	EP+	EP-	EQ+	EQ-	AOG	AO1	AO2

Note 1 : In the three-phase four-wire system, VN is connected to the neutral line of the grid; in the three-phase three-wire system, VN is connected to the L2 phase voltage;

Note 2 : I11 is the current input, I12 is the current output, the others are the same;

Note 3 : DIG is the common terminal of digital input;

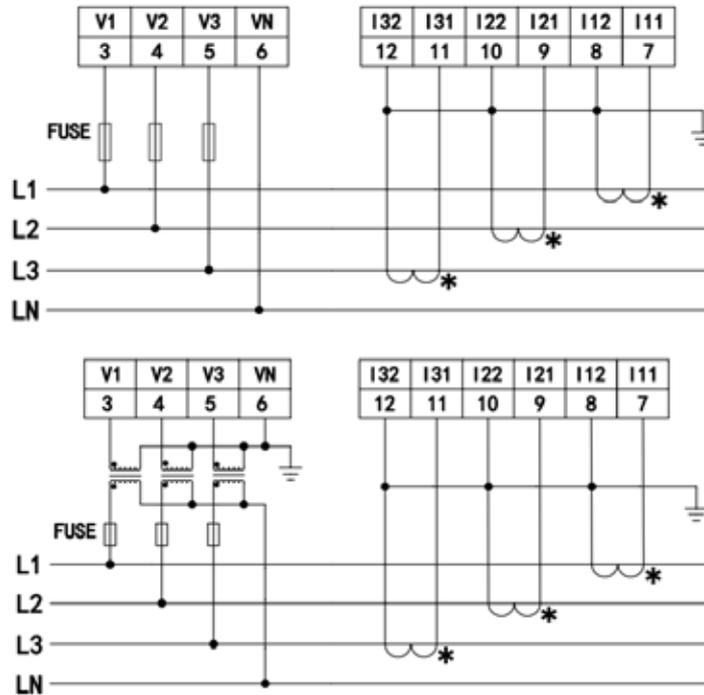
Note 4 : DO11 and DO12 are the same group of relay output, similarly DO21 and DO22 are another group;

Note 5 : The analog output is self-powered, AOG is the negative public output, AO1/AO2 is the positive output;

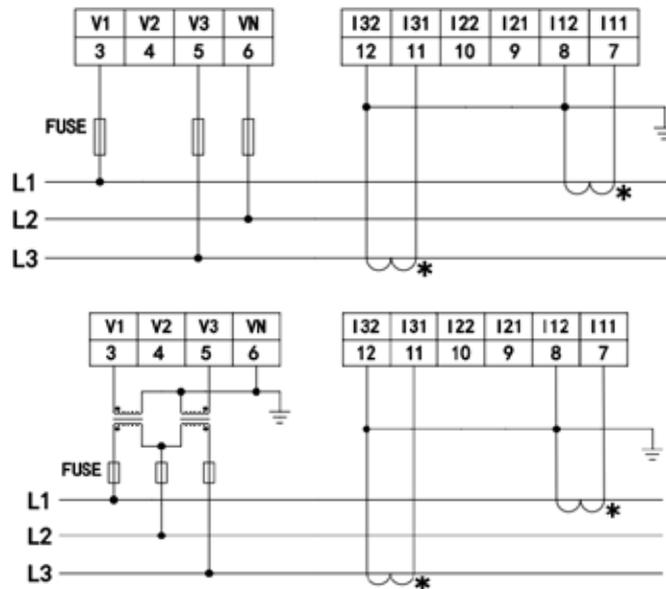
Note 6 : Energy pulse output is passive open-collector output, which requires an external power supply. EP+ is the collector and EP- is the emitter.

4. Electrical wiring

4.1 Three-phase four-wire system 3CT



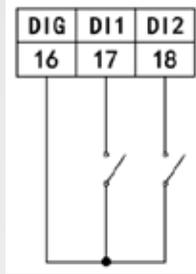
4.2 Three-phase three-wire system 2CT



Note 1 : The input voltage cannot be greater than AC 480V (line voltage); Otherwise, you should consider using an external PT.

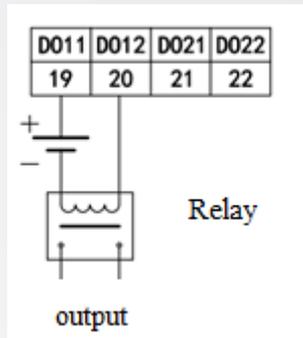
Note 2 : The input current cannot be greater than 5A; Otherwise, an external CT should be considered. If other instruments are connected to the CT used, the wiring should be connected in series. Before removing the current input connection of the product, be sure to disconnect the primary side of the CT or short-circuit the secondary side.

4.3 Switch input (Abbreviation: DI)



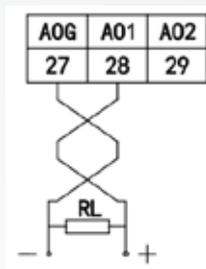
1. DI can simultaneously monitor the switch/digital status of 2 passive dry node inputs;
2. DI can transmit the status information of the switch input to the host computer through the "remote signal" method.

4.4 Relay output (Abbreviation: DO)



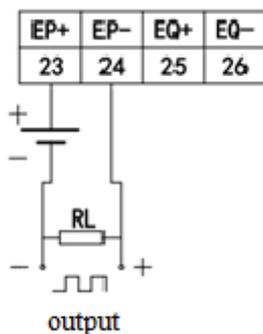
1. DO can be associated with electrical parameters "over current, over voltage, under voltage, over frequency, under frequency, voltage unbalance, current unbalance", and set the over-limit parameters, when the conditions are met, output an alarm signal;
2. DO can be associated with DI, coordinate with DI real-time status, and output signal;
3. The output of DO can be directly controlled by the host computer through the "remote control" method.

4.5 Analog output (Abbreviation: AO)



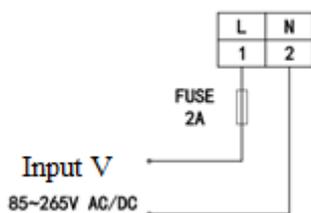
1. AO can associate electrical parameters "phase current, phase voltage, phase line voltage, total active power, power factor", and convert them into DC current output;

4.6 Energy pulse output (Abbreviation: PO)

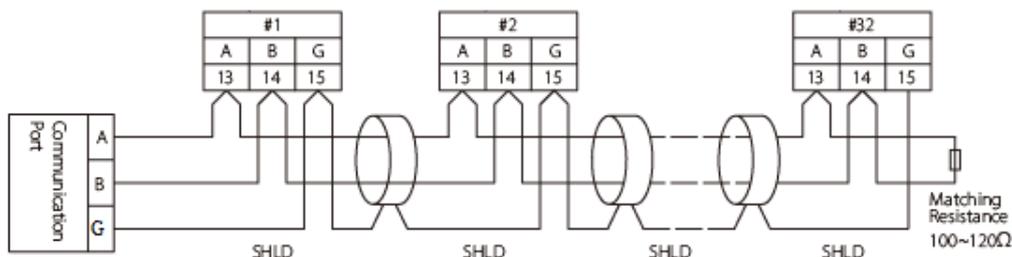


1. PO is divided into two outputs, EP is the total active energy output, EQ is the total reactive energy output;

4.7 Auxiliary power



4.8 Communication wiring



1. The communication line adopts shielded twisted pair, and communication line A and communication line B cannot be reversed;
2. When multiple instruments are connected to communication, a matching resistance of 100~120Ω should be connected to the communication cable terminal.

5. Operation guide

5.1 Key Description



- “Esc” Key : Back key, used to return to the previous menu (settings), operation is ignored;
- “↑” Key : Up key, used to switch the first-level menu (settings), switch setting options, and change values;
- “↓” Key : Down key, used to switch and change the value of the second-level menu (setting);
- “↵” Key : Confirmation key, used to enter the next menu (setting) and confirm operation.

5.2 LCD display description

Display content	Explanation
Measurement data display four rows and four positions	Mainly display electrical parameter data: voltage, current, power, electric energy, etc. Secondly, it displays menus, functions, parameters, setting values, etc.
Electric energy accumulation display single row eight digits	Mainly display active energy data and reactive energy data.
Unit kV · kA · kW · MW · kvar · Mvar kwh · kvarh · Hz · %	Electric parameter unit: voltage V, kV; current A, kA; active power W, kW, MW; reactive power var, kvar, Mvar; active electric energy kwh; reactive electric energy kvarh; frequency Hz; percentage %.
Function code, three digits in the upper left corner	The function code is composed of three English letters and is used to indicate the meaning of the current display interface: for example, "U" means voltage, "I" means current, "PqS" means power, "EP+" means positive active energy, etc.
Reactive four-quadrant identification 	The current loop is an inductive load; The current loop is a capacitive load; I II III IV : The load corresponds to the quadrant position.
RS485 communication logo	Displaying this logo means that the current communication is RS485 interface; No display of this symbol means that there is no RS485 communication function.
LoRa communication logo	Displaying this logo means that it is currently LoRa wireless communication; No display of this logo means that there is no LoRa communication function.
Prompt $\frac{P}{1-2}$ $\frac{Q}{2-3}$ $\frac{S}{3-1}$ $\Sigma \frac{Avg}{N}$	P, Q, S represent active power, reactive power, and apparent power respectively; 1, 2, and 3 respectively represent 1 phase, 2 phases and 3 phases; Σ represents the total; Avg represents the average value; "-" represents the negative number
Switch quantity indication DO 1 2 DI 1 2	DO means relay output; DI means switch input; 1, 2 means 1 way and 2 way respectively; 1, 2 shows that the current DI has input or DO has output

5.3 Measurement data display interface

In the measurement state, the initial interface is voltage "U", press "↑" "↓" keys to switch to the first level menu: voltage "U" ↔ current "I" ↔ power "PqS" ↔ total active energy "EPT" ↔ total reactive energy "EqT" ↔ demand "dPM" ↔ total harmonic distortion rate "THd" ↔ real-time clock "TIM" ↔ setting "SET" ↔ voltage "U". Any first-level menu can be pressed to enter the second-level menu (the detailed items corresponding to the first-level menu). For any second-level menu, continue to press "←" key to view more detailed items, press "Esc" key to return to the previous page, and press "↑"、"↓" keys to jump directly to the next menu. If no key is pressed within 60 seconds, the system will automatically return to the initial interface voltage "U".

5.3.1 Measuring voltage display, voltage "U"

- ① The first-level menu, displays the phase voltage U1, U2, U3 and the average value Uavg of the phase voltage.

As shown in the figure, U1=230V; U2=230.1V; U3=230V; Uavg=230V

Note: When the wiring mode is three-phase three-wire system, this page is not displayed.



- ② The first screen of the second-level menu displays the line voltage U12, U23, U31 and the average line voltage Uavg.

As shown in the figure, U12=381.0V; U23=381.1V; U31=381.1V; Uavg=381.1V.



- ③ The second screen of the second-level menu, displaying frequency F

As shown in the figure, the voltage frequency F=50.00Hz.



- ④ The sixth to ninth screens of the second-level menu display the peak, peak, flat, and valley total active energy EPS, EPP, EPF, EPV in sequence.

As shown in the figure, the peak total active electric energy EPS=68.1kwh.



5.3.2 Measuring current display, current "I"

- ① The first-level menu displays the split-phase current I1, I2, I3 and the average current Iavg.

As shown in the figure, I1=100.1A; I2=99.59A, I3=100.0A,

Average current = 99.89A.



- ② The second level menu, displaying the neutral wire current value IN

Note: When the wiring mode is three-phase three-wire system, this page is not displayed.

As shown in the figure, IN=0.988A.



5.3.3 Measuring power display, power "PqS"

- ① The first-level menu shows the total active power ΣP , total reactive power Σq , total apparent power ΣS , total power factor PF, and four-quadrant schematic diagram. As shown in the figure, $\Sigma P=1100w$; $\Sigma q=0.053var$; $\Sigma S=1100VA$; Total power factor $PF=0.997$; inductive load I quadrant. Note: The power factor symbol follows the IEC symbol convention.



- ② The first, second and third screens of the second-level menu display the split-phase active power, split-phase reactive power, and split-phase apparent power in sequence.

As shown in the figure, $P_1=1150w$; $P_2=1150w$; $P_3=1152w$,
The total active power $\Sigma P=3452w$.

Note: When the wiring mode is three-phase three-wire system,
this page is not displayed.

The display of split-phase reactive power and split-phase apparent power is similar.



5.3.4 Measuring electric energy display, active electric energy "EPT"

- ① The first level menu displays the total active energy EPT. As shown in the figure, the total active electric energy $EPT=1783.5kwh$.



- ② The first, second and third screens of the second-level menu display the active energy EP1, EP2, and EP3 of phase 1, phase 2, and phase 3 in sequence.

As shown in the figure, the first phase active energy $EP_1=768.9kwh$.

Note: When the wiring mode is three-phase three-wire system,
this page is not displayed.



- ③ The fourth and fifth screens of the second-level menu display the forward total active energy EP+ and the reverse total active energy EP- in sequence.

As shown in the figure, the forward total active energy $EP_+ =2883.6kwh$.



- ④ The sixth to ninth screens of the second-level menu display the peak, peak, flat and valley total active energy EPS, EPP, EPF, EPV in sequence.

As shown in the figure, the peak total active electric energy $EPS=68.1kwh$.



5.3.5 Measuring electric energy display, reactive electric energy "EqT"

① The first-level menu displays the total reactive energy EqT.
As shown in the figure, the total reactive energy EqT=182.9kvarh.



② The second-level menu display can refer to active energy.

5.3.6 Measuring demand power display, demand power "dPM"

① The first-level menu displays the maximum demand active power.
As shown in the figure, the maximum demand active power = 1.874kw,
Time of occurrence: 16:03 on July 28, 2020.



② The second level menu displays the maximum demand current.
As shown in the figure, I1 demand current=160.8A, I2 demand current=97.64A,
I3 demand current = 139.8A, average demand current = 132.7A.

5.3.7 Measuring total harmonic distortion rate display, demand power "THd"

① The first-level menu displays the total harmonic distortion rate of the split-phase voltage.

As shown in the figure, U1's THD=0.532%, U2's THD=0.497%,
The THD of U3 = 0.518%.

Note: When the wiring mode is three-phase three-wire system, this page is not displayed.



② The second-level menu displays the total harmonic distortion rate of the split-phase current.

As shown in the figure, the THD of I1=4.665%, the THD of I2=4.997%,
The THD of I3=4.568%.



5.3.8 Real-time clock display

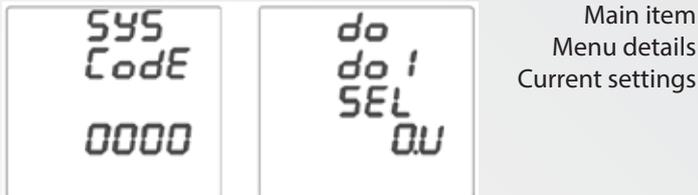
As shown in the figure, the time is 12:11:23 on July 28, 2020.



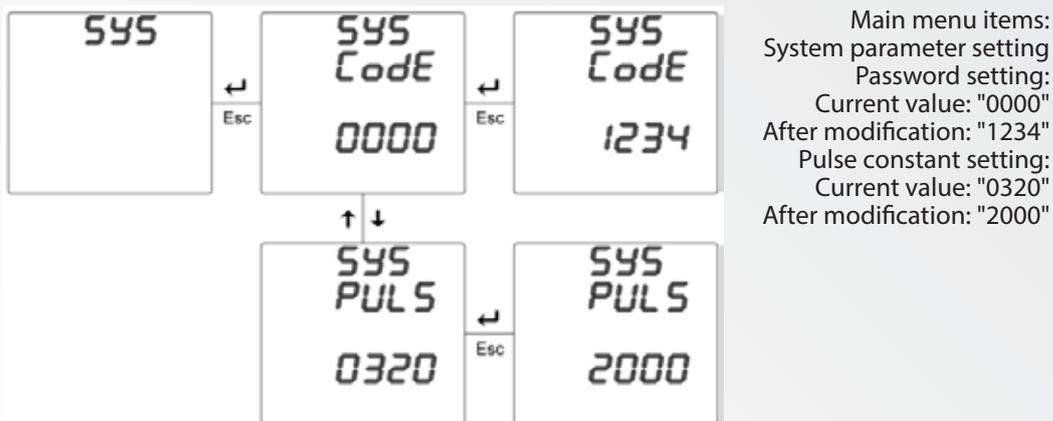
5.4 Parameter setting

In the measurement state, switch to the setting "SET" interface (parameter setting), and press "**Enter**" key to enter the password authentication interface. The password has four digits, the setting range is 0000~9999, and the factory default value is 0000. Use "**Up**"、"**Down**" and "**Enter**" to input the password, and press "**Enter**" key again to confirm after setting the four-digit password. If the interface displays "ERR", it means that the password input is incorrect. Password authentication will be prompted every time you want to enter the parameter setting.

Enter the parameter setting, the initial interface is the system setting "SYS", press "**Up**" and "**Down**" keys to switch to view the setting menu: system "SYS", rated input "INPT", relay output "DO", analog output "AO", compound rate "RATE", real-time clock "TIME", communication "COM".



Press "**Enter**" key at any level 1 setting menu to enter the level 2 setting menu, and press "**Esc**" key on the level 2 menu interface to return to the level 1 menu. After entering the secondary menu interface, the current parameter setting value can be directly consulted. If you need to modify the parameters, you need to press "**Enter**" key again to enter the parameter modification interface, and change the setting parameters by pressing "**Up**"、"**Down**" keys. After setting the parameters, press "**Enter**" key to confirm the operation, and press "**Esc**" key to ignore the operation.



Main menu items:
 System parameter setting
 Password setting:
 Current value: "0000"
 After modification: "1234"
 Pulse constant setting:
 Current value: "0320"
 After modification: "2000"

Secondary menu Parameter modification

5.4.1 System setting "SYS"

The main menu item "SYS" means system parameter setting;

Menu item "CODE" means password setting;

As shown in the figure above, the current password is "0000", and the password after modification is "1234";

The menu item "PULS" represents the energy pulse constant setting, as shown in the figure above, the current setting value is "320".

"320" means pulse constant = displayed value×100 = 320×100 = 32000imp/kwh, as shown in the figure above, the current pulse constant is 32000imp/kwh, and it is 200000imp/kwh after modification.

Brief introduction of power pulse output function: The power pulse output function needs to be used with "M3 module".

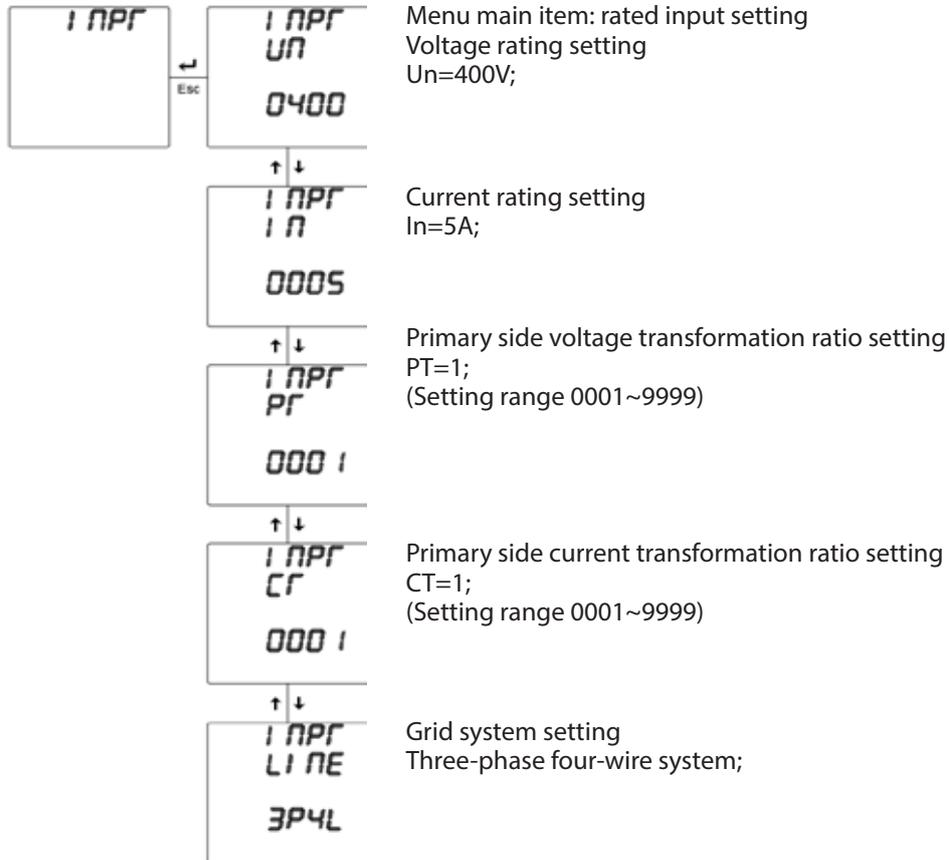
Take the above setting as an example, when the meter's secondary side electric energy accumulates 1kwh, the electric energy pulse outputs 32,000 pulses.

When the meter has external PT and CT, the corresponding electric energy of 32000 pulses is 1kwh×PT transformation ratio×CT transformation ratio.

5.4.2 Rated input setting "INPT"

The main menu item "INPT" represents the rated input setting;

The menu items "Un, In, PT, CT, LINE" successively indicate rated voltage (line voltage), rated current, primary-side PT voltage transformation ratio, primary-side CT current transformation ratio, and grid system settings.



5.4.3 Relay output setting "DO"

The main menu item "DO" means relay output setting;

The menu item "DO1" on the second line represents the output setting of the first relay, and "DO2" represents the second relay;

The detailed menu items "SEL, GATE, DLE" on the third line respectively indicate the relay output related parameters, alarm threshold, and over-limit delay setting;

The "SEL" relay output related parameters are set as following:

Interface display	Related parameter description	Interface display	Related parameter description
0.oU	Overvoltage alarm	5.Ul	Voltage unbalance alarm
1.UU	Undervoltage alarm	6.IL	Current imbalance alarm
2.l	Over current alarm	7.d1	Digital DI1 monitoring alarm
3.oF	Over frequency alarm	8.d2	Digital DI2 monitoring alarm
4.UF	Under frequency alarm	9.r	Communication control

Note 1: Relay output function needs to be used with "M2 module";

Note 2: Over.. alarm means that when the associated parameter is greater than the alarm threshold, the relay output is turned on;

Note 3: Under.. alarm means that when the associated parameter is less than the alarm threshold, the relay output is turned on;

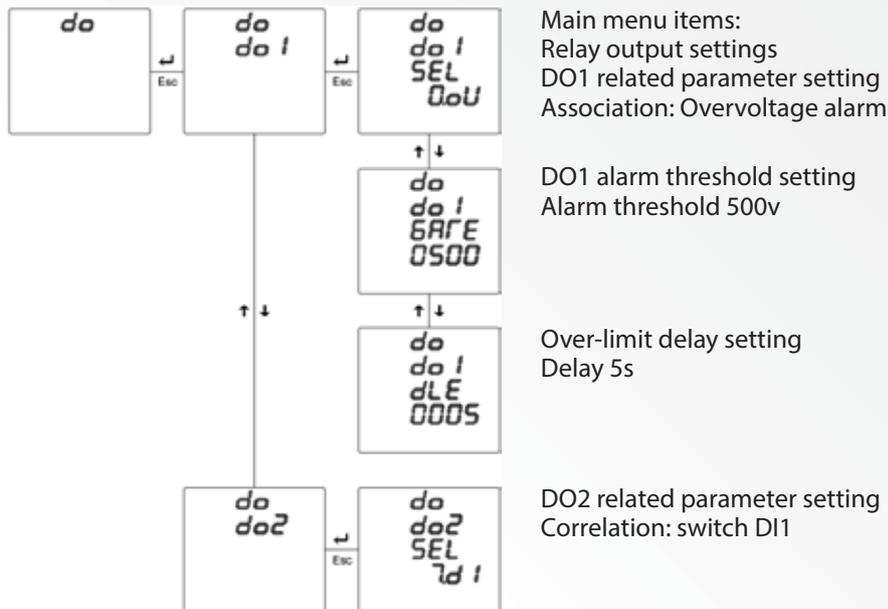
Note 4: Over-limit delay means the duration of when the associated parameter is greater than/less than the alarm threshold;

Note 5: Digital monitoring alarm means that the associated digital input status is used as an alarm output. When the digital input is on, the relay output is on;

Note 6: When the relay output is associated with communication control, it must be used with "M1 module or M4 module" at the same time. Communication control means that the upper computer realizes remote control of the output status of the relay through communication;

Note 7: Switch monitoring alarm and communication control, no need to set alarm threshold and over-limit delay.

As shown in the figure below, the first relay output (hereinafter referred to as DO1) is associated with "overvoltage alarm", and the alarm threshold is 500V. When any line voltage is greater than 500V and the limit time exceeds 5s, DO1 is turned on; the second relay output (Hereinafter referred to as DO2) is associated with "DI1", when the meter detects that DI1 is on, DO2 is on.



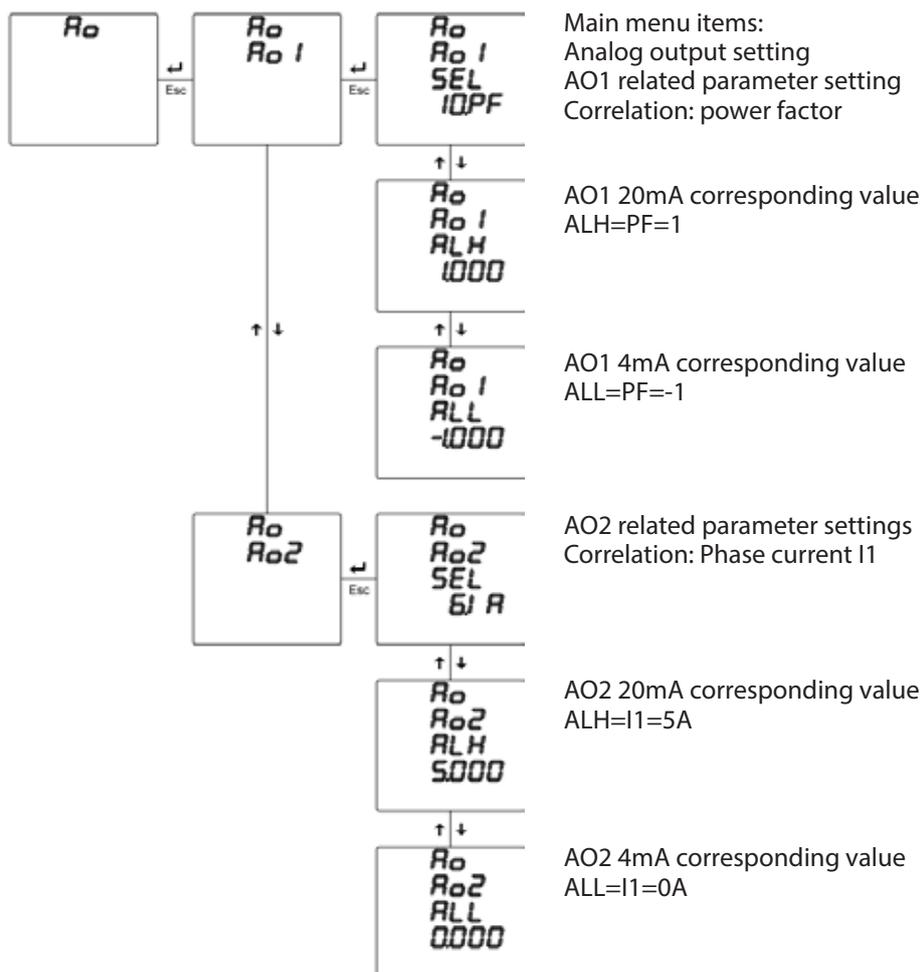
5.4.4 Analog output setting "AO"

The main menu item "AO" means analog output setting;

The menu item "AO1" on the second line represents the first analog output setting, and "AO2" represents the second channel;

The detailed menu items "SEL, ALH, ALL" on the third line respectively represent the analog output related parameters, the corresponding value of analog 20mA, and the corresponding value of analog 4mA;

Introduction to analog output function: analog output is also called transmission output. When measuring various non-electrical physical quantities (temperature, pressure, speed, etc.), they need to be converted into analog quantities to achieve long-distance transmission. The meter can convert the input signal (voltage, current, power, etc.) into a standard current signal (DC4-20mA, the most widely used in industry) through the "M3 module" for the back-end control room or display equipment collection. While realizing long-distance transmission, it also has the advantage of not being affected by the nature of the load and the noise voltage in the line.



"SEL" analog output related parameters are set as following.

Interface display	Related parameter description	Interface display	Related parameter description
0.UA	Phase voltage U1	6.IA	Phase current I1
1.UB	Phase voltage U2	7.IB	Phase current I2
2.UC	Phase voltage U3	8.IC	Phase current I3
3.UAB	Line voltage U12	9.Pt	Total active power
4.UBC	Line voltage U23	10.PF	Power factor
5.UCA	Line voltage U31		

As shown in FIG,

The first analog output (hereinafter referred to as AO1) is associated with "power factor", analog 20mA corresponds to "PF=1.0", analog 4mA corresponds to "PF=-1.0", when the meter detects that the power factor is 0.8, AO1 outputs 18.4 mA.

The second analog output (hereinafter referred to as AO2) is associated with "phase current I1". The analog 20mA corresponds to 5A, and the analog 4mA corresponds to 0A. When the meter detects I1 as 1A, AO2 outputs 7.2mA.

Note 1: The analog output function can only be used with "M3 module";

Note 2: The maximum effective output of analog output is 120% ALH (20mA corresponding value);

Note 3: The analog output is usually used with a load resistance, and the load resistance needs to be $\leq 600\Omega$.

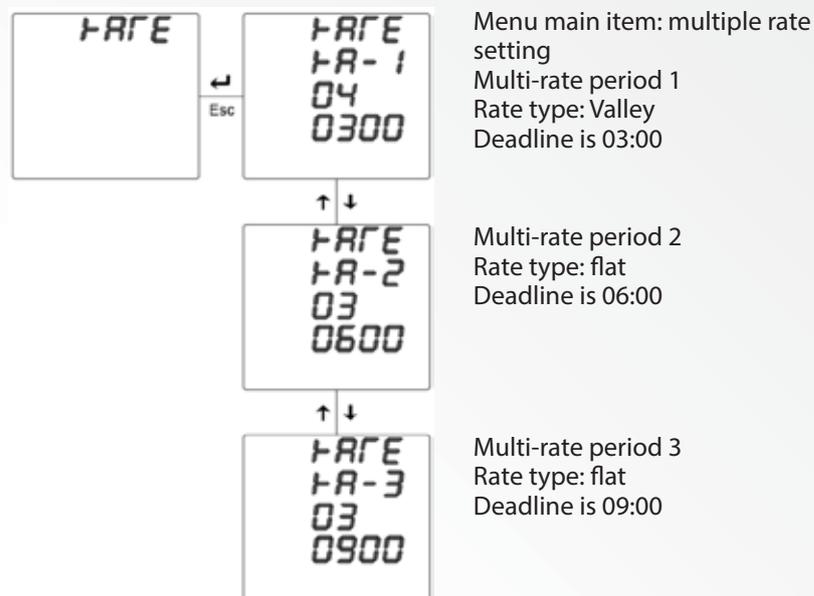
5.4.5 Multi-rate setting "RATE"

The main menu item "RATE" means multiple rate setting;

The detailed menu items "RA-1, RA-2, RA-3.....RA-8" in the second line respectively represent the multiple rate period 1, period 2, period 3...period 8;

The detailed menu items "01, 02, 03, 04" on the third line respectively represent the peak, peak, flat, and valley rate;

The fourth row represents the cut-off time (time) corresponding to each multiple rate period.



Time period	Rate	deadline	Rate and time period description
1	04	03:00	During 00:00 ~ 03:00, the rate is low
2	03	06:00	From 03:00 to 06:00, the rate is flat
3	03	09:00	From 06:00 to 09:00, the rate is flat
4	02	12:00	From 09:00 to 12:00, the rate is peak
5	02	15:00	From 12:00 to 15:00, the rate is peak
6	01	18:00	From 15:00 to 18:00, the rate is high
7	03	21:00	From 18:00 to 21:00, the rate is flat
8	04	24:00	From 21:00 to 24:00, the rate is low

Introduction to the multi-rate function: Multi-rate is also called multi-rate. That is, the electricity consumption (active/reactive energy) is counted according to different time periods, so as to charge electricity fees at different prices, and users are encouraged to take the initiative to avoid peaks and fill valleys to benefit both supply and demand.

Note 1: The peak/peak/flat/valley active energy can be viewed on the sixth to ninth screens of the second-level menu of the active energy measurement interface;

Note 2: Peak/peak/level/valley reactive energy can be viewed on the sixth to ninth screens of the second-level menu of the measurement reactive energy interface;

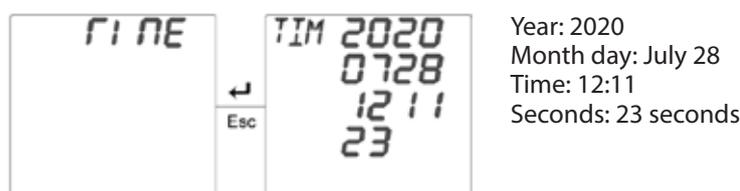
Note 3: When setting the cut-off time, the time of the later period should be greater than that of the previous period, otherwise it cannot be set.

5.4.6 Real-time clock setting "TIME"

The main menu item "TIME" means real-time clock setting;

Use "↑", "↓" and "←" to set the time, and press "←" again to confirm after setting.

As shown in the figure below, the current setting time is 12:11:23 on July 28, 2020.



5.4.7 Communication setting "COM"

The main menu item "COM" means communication parameter setting;

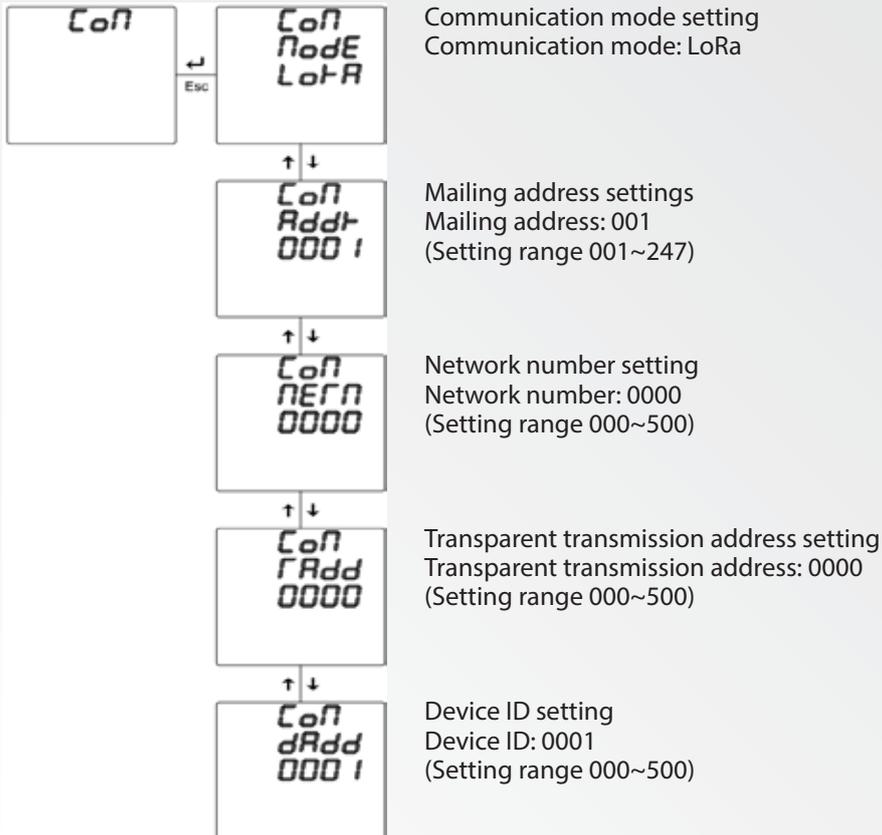
The menu item "MODE" represents the communication mode, which is divided into "R485" wired RS485 and "LoRa" wireless LoRa.

The two communication mode setting menu items are different.

The RS485 communication mode menu items "baud, pari, addr" respectively represent the baud rate, parity bit, and communication address settings.

LoRa mode communication menu detailed items "addr, metm, tadd, dadd" respectively represent the communication address, network number, transparent transmission address, and device ID settings.

Communication mode setting



Note 1: RS485 communication adopts differential half-duplex interface;

Note 2: LoRa communication, in the same network, the network numbers of all devices must be consistent;

Note 3: LoRa communication, the device ID, that is, the local address, in the same network, the device ID is not repeatable;

Note 4: LoRa communication, the transparent transmission address, that is, the final destination address, corresponds to the ID of the gateway device that needs to communicate.

6. About communication

The communication function supports ModBus_RTU protocol. For detailed instructions, you can log in to the official website to download "PM40 Power Meter Communication Protocol ModBus_RTU" (the mobile phone can directly scan the QR code on the nameplate to log in to the official website to download).

7. Common fault analysis and troubleshooting

7.1 The meter does not light up (not working)

1. Check whether the wiring is correct and whether the auxiliary power supply has been added to the auxiliary power supply terminal of the instrument;
2. Check whether there is a power supply and whether it is within the rated voltage range;
3. Replace a product of the same type to see if it can work normally.

7.2 Inaccurate product measurement

1. The voltage and current signals can be measured with a multimeter and a clamp meter respectively;
2. Check whether the phase sequence of the same terminal and each phase of the current CT is connected correctly;
3. If there is an external CT, PT, check whether the instrument transformation ratio setting is correct

7.3 Abnormal communication

1. RS485 communication is poor: check whether the communication settings (baud rate, parity bit, communication address) are set correctly, for example, the baud rate and parity bit must be consistent with the host computer.
2. Poor LoRa communication: reset the network number, transparent transmission address, and change ID.

Note: Be sure to contact the company's technical staff before performing various unconventional operations. The company is not responsible for the losses and consequences caused by the customer's own improper operation.

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