

**Danger and Warning**

- The device can only be installed by professionals.
- The manufacturer will not take responsibility for failures caused by non-compliant operation not following this manual.

**Electric shock,burning and explosion**

- Device should only be installed and maintained by qualified personnel.
  - Before carrying out any operation on the device, isolate the voltage input and power supply, and short-circuit the secondary windings of all current transformers.
  - Confirm that the voltage has been cut off before operation.
  - All mechanical parts and covers, etc. should be restored to their original positions before the device is powered up.
  - The device should be supplied with the correct rated voltage during use.
- Note:** Please pay attention to these precautions. Or it will cause serious danger.

**1 Overview****1.1 Function introduction**

KPM33B three-phase DIN rail smart energy meter is designed with three-phase electrical parameter measurement, display, energy accumulation, and network communication, etc. It's with strong anti-interference ability, and can work stably even in serious electromagnetic interference.

**1.2 Application**

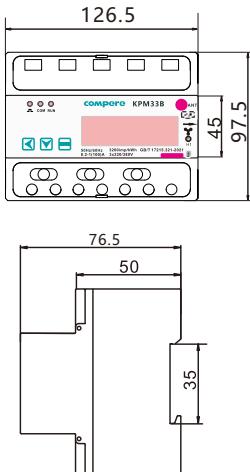
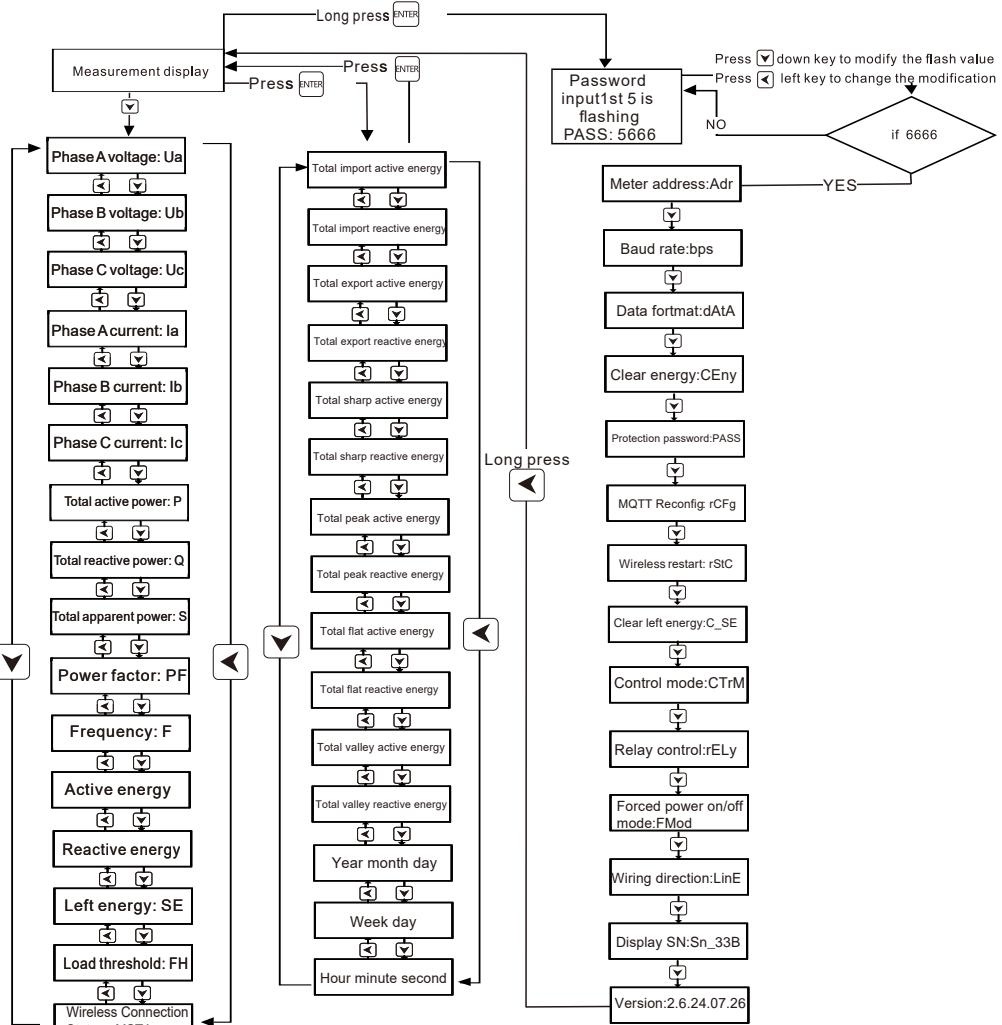
- Measure and monitor electric energy parameters in the distribution system.
- Energy efficiency management system
- Statistical analysis of internal power consumption and basis for charging statistics
- Automatic meter reading system for electric energy measurement
- Intelligent power distribution management system

**1.3 Function features**

- Measure three-phase voltage, current, active power, reactive power, apparent power, active/reactive energy, power factor, frequency, etc..
- High accuracy Class 0.5S bidirectional four-quadrant power statistics.
- Multi-rate energy metering, 4 time zones, 8 time periods, 4 rates.
- 1\*RS485 port with Modbus-RTU protocol.
- Optional 4G for MQTT protocol.
- 12-month historical energy statistics.
- Rated current 0.2-100 A for direct wiring and rated 5A for indirect wiring.
- Rated voltage 380VAC.
- LED pulse indicator.
- 1 channel passive optocoupler collector active pulse output.
- Built-in relay for remote control for prepaid function.
- 35mm standard rail installation.

**2 Technical Parameters****2.1 Environmental Conditions**

Working temperature: -25°C~70°C  
Relative humidity: 5%~95% non-condensing  
Storage temperature: -30°C~75°C  
Altitude: Below 3000 meters

**Measurement display and setup display flow chart****5.3 Parameter settings**

Before starting the measurement, please make the settings. When entering the setting screen, you need to press and hold **ENTER** for 3s to enter the password input interface, the default password: 6666. Press the **ENTER** key to enter the parameter setting interface, then press the **↓** key to select the parameters to be set. After pressing the **ENTER** key, the leftmost digit of the set value starts to flash. Press the **↓** key to select the digit to be modified, and press the **↑** key to increase the value of the modified digit. After all modifications are completed, press the **ENTER** key to confirm. In the setting interface, if no key is pressed for 30s, it will return to measurement display screen.

**2.2 Rated Parameters**

Input voltage: Rated AC 3\*220V  
Input current: 0.2-1(100)A  
Power consumption: Whole set power consumption < 2VA  
Overload capacity:  
AC voltage loop: 1.2 times rated voltage, continuous work 2 times rated voltage, allow 10s  
AC current loop: 1.2 times rated current, continuous work 20 times rated current, allow 1s

**2.3 Measurement Accuracy Index**

| Parameters | Accuracy | Parameters | Accuracy |
|------------|----------|------------|----------|
| U          | ±0.2%    | PF         | ±0.5%    |
| I          | ±0.2%    | kWh        | 0.5s     |
| P          | ±0.5%    | kVar       | Class 2  |
| Q          | ±2%      | F          | ±0.02Hz  |

**2.4 Electrical insulation Performance**

Medium strength:  
Comply with GB/T13729-2002 regulations, Power frequency voltage 2KV, time 1 minute

**Insulation resistance:**

Comply with GB/T13729-2002 regulations, 500V megger test, insulation resistance not less than 50MΩ

**Impulse voltage:**

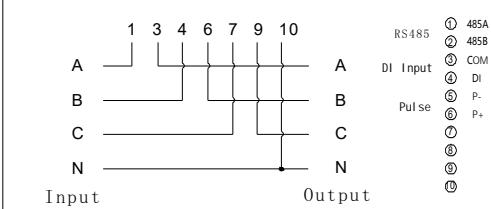
Comply with GB/T13729-2002 regulations, Withstand the impact of 1.2/50US peak 5KV standard lightning wave

**2.5 Mechanical properties**

Vibration: Vibration response: GB/T11287-2000, level 1  
Vibration durability: GB/T11287-2000, level 1  
Impact: Impact response: GB/T14537-1993, level 1  
Impact durability: GB/T14537-1993, level 1  
Collision: GB/T14537-1993, level 1

**2.6 Electromagnetic compatibility**

Electrostatic discharge immunity : IEC61000-4-2, level 4  
Fast pulse group immunity : IEC61000-4-4, level 4  
Surge immunity : IEC61000-4-5, level 4  
Power frequency magnetic field immunity :IEC61000-4-8, level 4

**3 Installation and Wiring****3.1 Product size****3.2 Installation and Wiring****3.2.1 Direct wiring****3.3 Terminal definition**

| No. | Terminals | Definition                        | Remark   |
|-----|-----------|-----------------------------------|--|
| 1   | Ain       | Phase A power/current input       |  |
| 3   | Aout      | Phase A power/current output      | When the current is indirectly connected, this terminal is only a current sampling terminal. |
| 4   | Bin       | Phase B power/current input       |  |
| 6   | Bout      | Phase B power/current output      |  |
| 7   | Cin       | Phase C power/current input       |  |
| 9   | Cout      | Phase C power/current output      |  |
| 10  | N         | Voltage sampling public terminals |  |
| ①   | 485A      | RS485A                            |  |
| ②   | 485B      | RS485B                            |  |
| ③   | COM       | DI common port                    |  |
| ④   | DI        | DI input                          |  |
| ⑤   | P-        | Pulse output +                    |  |
| ⑥   | P+        | Pulse output -                    |  |
| ⑦   |           |                                   |  |
| ⑧   |           |                                   |  |
| ⑨   |           |                                   |  |
| ⑩   |           |                                   |  |

**4 Function Description****4.1 Energy Measurement**

KPM33B records historical total active energy, total reactive energy, import/export active/reactive energy, active energy and reactive energy consumption for last 12 months(0:00 on the 1st of each month). KPM33B also provides multi-rate electric energy, provides 4 rates for sharp, peak, flat and valley time. It can set up to 8 time periods in 24hours a day and record the total active/reactive energy for four rates.

**Example:** The daily electricity metering is calculated in 5 time slots. The details are as follows:

| Period   | Start time point | Tariff |
|----------|------------------|--------|
| 1#Period | 6                | 1      |
| 2#Period | 10               | 2      |
| 3#Period | 12               | 1      |
| 4#Period | 15               | 3      |
| 5#Period | 23               | 4      |

**Description**

- 1# Period: from 6 to 10, the tariff is 1;
  - 2# Period: from 10 o'clock to 12 o'clock, the tariff is 2;
  - 3# Period: from 12 o'clock to 15 o'clock, the tariff is 1;
  - 4# Period: From 15:00 to 23:00, the tariff is 3;
  - 5# Period: From 24 o'clock to 6 o'clock the next day, the tariff is 4.
- Remark: The electricity kWh of the same tariff will be calculate together.

**4.2 Pulse**

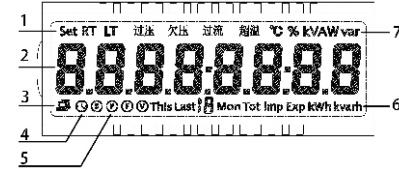
Pulse output: KPM33B provides active/reactive energy metering, 1 active energy pulse output function, using optocoupler open collect or output. The method of energy accuracy inspection refers to the national measurement regulations:

Measurement procedures: Pulse error comparison methods for standard meters.

Electrical characteristics: Open collector voltage VCC ≤ 48V, current IZ ≤ 50mA  
Pulse constant: 3200imp/kWh

**4.3 Relay**

Relay on/off status can be read and set by Modbus RTU or MQTT.

**5 Operation Instructions****5.1 Interface display**

| No. | Content displayed                 | Detailed description   |
|-----|-----------------------------------|--|
| 1   | Settings                          | Display when setting parameters  |
| 2   | Display indication                | Digital tube display UA (Phase A voltage), Ub (Phase B voltage), Uc (Phase C voltage), IA (Phase A current), Ib (Phase B current), Ic (Phase C current), P (total active power ), q (total reactive power), S (total apparent power), PF (average power factor), F (frequency), bd (baud rate), Ad (address), active energy, reactive energy, relay status |
| 3   | Communication indication          | Two small computers at the bottom left of the screen during communication  |
| 4   | Time indication                   | When the enter key is pressed, the time and electrical parameters are switched and displayed   |
| 5   | Sharp, peak, flat, valley display | Multi-rate power display   |
| 6   | Power display                     | Display active power and reactive power  |
| 7   | Electric parameter unit symbol    | Voltage V, kV; Current A, kA; Active power: W, kW; Reactive power var, kvar; Apparent power: VA, kVA   |

**5.2 Operation and display**

Measurement and setting display flow chart  
Three touch buttons on the front panel, they are labeled from left to right as **◀** key, **▼** key, **ENTER** key. The display of different measurement data and the setting of parameters can be realized through the operation of three buttons.

| Name of key            | Functional description  |
|------------------------|---|
| <b>◀</b> Down key      | Switching power parameters display. (Last one) If it is in the parameter setting state, it is used to move the bit to be modified.  |
| <b>▼</b> Left key      | Switching power parameters display. (Next one) If it is in the parameter setting state, it is used to increase the parameter values   |
| <b>ENTER</b> Enter key | In the power parameter measuring state, it is used to enter the parameter setting interface. In the parameter setting state, it is used to enter the parameter setting state and confirm the parameter setting. |

**9. Control mode setting**

Used to change the control mode of the meter relay.

Note: rMod (remote control), LMod (local control)

|   |
|---|
| <input checked="" type="checkbox"/> Change option |
| rTRM: rMod  |

**10. Relay on/off setting**

Used to set the relay open or closed mode (only in local control mode, it will take effect from next time), and the status after the last relay action is displayed at the same time.

Note: on (relay close), off (relay open)

|   |
|---|
| <input checked="" type="checkbox"/> Change option |
| rELY: on  |

**11. Forced power on/off setting**

Displays the current forced power-on mode of the meter, which cannot be changed locally.

Note: n-P (non-forced mode), f-b (forced mode), f-P (mandatory power on mode)

|   |
|---|
| <input checked="" type="checkbox"/> Change option |
| Fmod: n_P   |

**12. Wiring direction setting**

Used to the meter's wiring direction.

Note: PoS (positive), nE (reverse)

|  |
| --- |
| Change option |


<tbl\_r cells="1" ix="2"

## 6 Communication

KPM33B supports MODBUS-RTU communication protocol, 1 start bit, 8 data bits, 1 parity bit, 1 stop bits.

Supported baud rates: 1200, 2400, 4800, 9600, 19200.

**Default parameters:** 9600bps, Even parity bit

**Format for each byte in RTU mode:** 1 start bit + 8 data bits + 1 parity bit + 1 stop bit

Data frame format:

**Address field + command field + data field + CRC check**

| Supported function code |      |                          |                                    |  |
|-------------------------|------|--------------------------|------------------------------------|--|
| DEC                     | HEX  | Definition               | Description                        |  |
| 01                      | 0X01 | Read relay output        | Read 1 or more relay output status |  |
| 03                      | 0X03 | Read register data       | Read 1 or multiple register        |  |
| 05                      | 0X05 | Write 1 relay output     | Control 1 relay close or open      |  |
| 16                      | 0X10 | Write multiple registers | Write multiple register data       |  |

### 6.1 Digital output control and status reading

This area stores relay status. Users can read it through function code 01H and control relay by 05H function code.

| Adr   | Parameter    | Data        | Data format | Attribute |
|-------|--------------|-------------|-------------|-----------|
| 0001H | Relay1 (DO1) | 1=ON, 0=OFF | Bit         | R/W       |

#### 6.1.1 Read relay status (function code 01H)

Request data frame: read Relay1 status.

| Addr | Fun | StartReg_hi | StartReg_lo | RegNum_hi | Reg Num_lo | CRC16_hi | CRC16_lo |
|------|-----|-------------|-------------|-----------|------------|----------|----------|
| 01H  | 01H | 00H         | 01H         | 00H       | 01H        | xxH      | xxH      |

**Response data frame:** The slave responds to the data frame of the master. Contains slave address, function data byte, relay status data and CRC error checking.

The status of each relay in the data packet occupies one bit (1=ON, 0=OFF), the 1st bit (lowest bit) of the first byte is the status value of the load control relay of phase A, and the 2nd bit of the first byte is the state value of load control relay of phase B, and the 3rd bit of the first byte is the state value of the load control relay of phase C.

| Addr | Fun | Bytecount | Data | CRC16hi | CRC16lo |
|------|-----|-----------|------|---------|---------|
| 01H  | 01H | 01H       | 01H  | 90H     | 48H     |

Data byte content (three-phase load control relay is closed)

| Bit7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|------|-------|-------|-------|-------|-------|-------|-------|
| 0    | 0     | 0     | 0     | 0     | 1     | 1     | 1     |

#### 6.1.2 Relay control (function code 05H)

Note that the data 0x0000 in the relay control message is the load control relay open, and the data 0xFF00 is the load control relay close.

| Addr | Fun | DOaddr_hi | DOaddr_lo | Value_hi | Value_lo | CRC16_hi | CRC16_lo |
|------|-----|-----------|-----------|----------|----------|----------|----------|
| 01H  | 05H | xx        | xx        | FFH      | 00H      | xxH      | xxH      |

Relay control: 0x0000, open load control relay.  
0xFF00, close load control relay.

## 6.2 Basic measurement parameters Area

This area stores system parameters related to equipment operation, including communication parameters, current ratio, etc., which can be read by using the Modbus protocol 03H function code or using the 10H function code setting.

|       |  |                |       |
|-------|--|----------------|-------|
| 0118H | Peak active energy of the previous 10 settlement day   | Floating point | kWh   |
| 011AH | Peak active energy of the previous 11 settlement day   | Floating point | kWh   |
| 011CH | Peak active energy of the previous 12 settlement day   | Floating point | kWh   |
| 011EH | Peak reactive energy of this month                     | Floating point | kvarh |
| 0120H | Peak reactive energy of the previous 1 settlement day  | Floating point | kvarh |
| 0122H | Peak reactive energy of the previous 2 settlement day  | Floating point | kvarh |
| 0124H | Peak reactive energy of the previous 3 settlement day  | Floating point | kvarh |
| 0126H | Peak reactive energy of the previous 4 settlement day  | Floating point | kvarh |
| 0128H | Peak reactive energy of the previous 5 settlement day  | Floating point | kvarh |
| 012AH | Peak reactive energy of the previous 6 settlement day  | Floating point | kvarh |
| 012CH | Peak reactive energy of the previous 7 settlement day  | Floating point | kvarh |
| 012EH | Peak reactive energy of the previous 8 settlement day  | Floating point | kvarh |
| 0130H | Peak reactive energy of the previous 9 settlement day  | Floating point | kvarh |
| 0132H | Peak reactive energy of the previous 10 settlement day | Floating point | kvarh |
| 0134H | Peak reactive energy of the previous 11 settlement day | Floating point | kvarh |
| 0136H | Peak reactive energy of the previous 12 settlement day | Floating point | kvarh |
| 0138H | Flat active energy for this month                      | Floating point | kWh   |
| 013AH | Last month flat active energy                          | Floating point | kWh   |
| 013CH | The month before last month flat active energy         | Floating point | kWh   |
| 013EH | The month before 2 month flat active energy            | Floating point | kWh   |
| 0140H | The month before 3month flat active energy             | Floating point | kWh   |
| 0142H | The month before 4 month flat active energy            | Floating point | kWh   |
| 0144H | The month before 5 month flat active energy            | Floating point | kWh   |
| 0146H | The month before 6 month flat active energy            | Floating point | kWh   |
| 0148H | The month before 7 month flat active energy            | Floating point | kWh   |
| 014AH | The month before 8 month flat active energy            | Floating point | kWh   |
| 014CH | The month before 9 month flat active energy            | Floating point | kWh   |
| 014EH | The month before 10 month flat active energy           | Floating point | kWh   |
| 0150H | The month before 11 month flat active energy           | Floating point | kWh   |
| 0152H | Flat reactive energy for this month                    | Floating point | kvarh |
| 0154H | Flat reactive energy for last month                    | Floating point | kvarh |
| 0156H | The month before last month flat reactive energy       | Floating point | kvarh |
| 0158H | The month before 2 month flat reactive energy          | Floating point | kvarh |
| 015AH | The month before 3month flat reactive energy           | Floating point | kvarh |
| 015CH | The month before 4 month flat reactive energy          | Floating point | kvarh |
| 015EH | The month before 5 month flat reactive energy          | Floating point | kvarh |
| 0160H | The month before 6 month flat reactive energy          | Floating point | kvarh |
| 0162H | The month before 7 month flat reactive energy          | Floating point | kvarh |
| 0164H | The month before 8 month flat reactive energy          | Floating point | kvarh |
| 0166H | The month before 9 month flat reactive energy          | Floating point | kvarh |
| 0168H | The month before 10 month flat reactive energy         | Floating point | kvarh |
| 016AH | The month before 11 month flat reactive energy         | Floating point | kvarh |
| 016CH | Valley active energy for this month                    | Floating point | kWh   |
| 016EH | Valley active energy for last month                    | Floating point | kWh   |
| 0170H | The month before last month valley reactive energy     | Floating point | kWh   |
| 0172H | The month before 2 month valley reactive energy        | Floating point | kWh   |
| 0174H | The month before 3month valley reactive energy         | Floating point | kWh   |
| 0176H | The month before 4 month valley reactive energy        | Floating point | kWh   |

| Adr   | Parameter     | Data range                | Format |
|-------|---------------|---------------------------|--------|
| 0000H | Password      | 0~9999                    | Word   |
| 0001H | Modbusaddress | Modbus-RTU address: 1~247 | Word   |

|       |                         |  |      |
|-------|-------------------------|--|------|
| 0002H | Baud rate & Parity      | Baud rate (BIT0~7) 0: 1200, 1: 2400, 2: 4800, 3: 9600, 4: 19200<br>Data format (BIT8~15): 0: 81E 1: 810 2: 81n | Word |
| 000CH | Clear energy data       | Command 0x5578, clear immediately<br>Command 0x5579, clear left prepaid energy                                 | Word |
| 000DH | Spare                   |  | Word |
| 000EH | Prepaidenergy           | Prepaid energy data(4bytes Float)  | Word |
| 0012H | Sn serial No. Read only | 14 consecutive bytes, the first 13 bytes are the serial number   | Word |
| 0019H | Spare                   |  | Word |

|       |                            |                |     |
|-------|----------------------------|----------------|-----|
| 0046H | Phase C active power       | Floating point | W   |
| 0048H | Three phase active power   | Floating point | W   |
| 004AH | Phase A reactive power     | Floating point | var |
| 004CH | Phase B reactive power     | Floating point | var |
| 004EH | Phase C reactive power     | Floating point | var |
| 0050H | Three phase reactive power | Floating point | var |
| 0052H | Phase A apparent power     | Floating point | VA  |
| 0054H | Phase B apparent power     | Floating point | VA  |
| 0056H | Phase C apparent power     | Floating point | VA  |
| 0058H | Three phase apparent power | Floating point | VA  |
| 005AH | Phase A power factor       | Floating point |     |
| 005CH | Phase B power factor       | Floating point |     |
| 005EH | Phase C power factor       | Floating point |     |
| 0060H | Three phase power meter    | Floating point |     |
| 0062H | Frequency                  | Floating point | Hz  |
| 0200H | Phase A apparent demand    | Floating point | VA  |
| 0202H | Phase B apparent demand    | Floating point | VA  |
| 0204H | Phase C apparent demand    | Floating point | VA  |

### 6.4 Multi rate area

All data in this area are primary cumulative energy consumption data, which can be read using the Modbus protocol 03H function code. The data format is Short floating point,big-endian. And the data is the primary data.

| Address | Parameter                     | Data type          | Unit |
|---------|-------------------------------|--------------------|------|
| 0068H   | Phase A forward active energy | Floating point     | kWh  |
| 006AH   | Phase B forward active energy | Floating point     | kWh  |
| 006CH   | Phase C forward active energy | Floating point</td |      |