PM-2133D-RCT Quick Start

v1.0, April 2025

Packing List

In addition to this guide, the package includes the following items:



PM-2133D-RCT * 1



Screw Driver * 1



Cable ties * 3



CT * 3

Technical Support

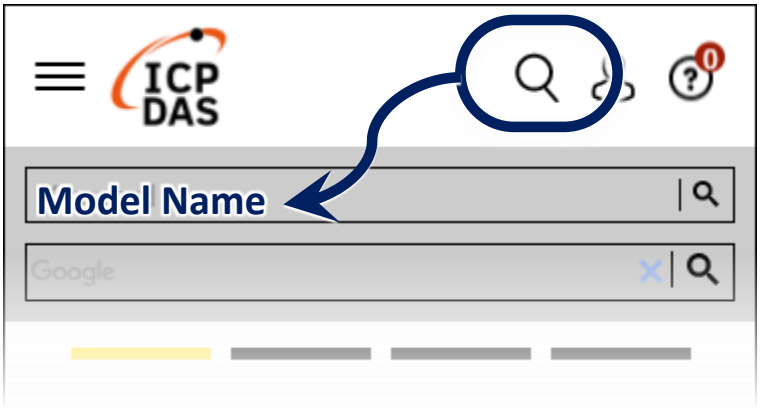
service@icpdas.com

www.icpdas.com

Resources

How to search for drivers, manuals and spec information on ICP DAS website.

- For Mobile Web



- For Desktop Web



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1.1.Caution & Warning



The meter contains hazardous voltages, and should never be disassembled. Failing to follow this practice will result in serious injury or death. Any work on or near energized meters, meter sockets, or other metering equipment could induce a danger of electrical shock. It is strongly recommended that all work should be performed only by qualified industrial electricians and metering specialist. ICP DAS assumes no responsibility if your electrical installer does not follow the appropriate national and local electrical codes.

ICP DAS assumes no liability for any damage resulting from the use of this product. ICP DAS reserves the right to change this manual at any time without notice.

2. Installation

2.1.

- Products come with external split type clip-on CT's. Disconnect the CT's or use other CT's is highly prohibited.
- Please read this operation manual carefully before using.
- Please re-confirm the measure position.
- Reconfirm the RST (ABC) phase sequence of the power system.
- Meter auxiliary power for PM-2133D-RCT series is AC +85 ~ +264 VAC (277 VAC available).

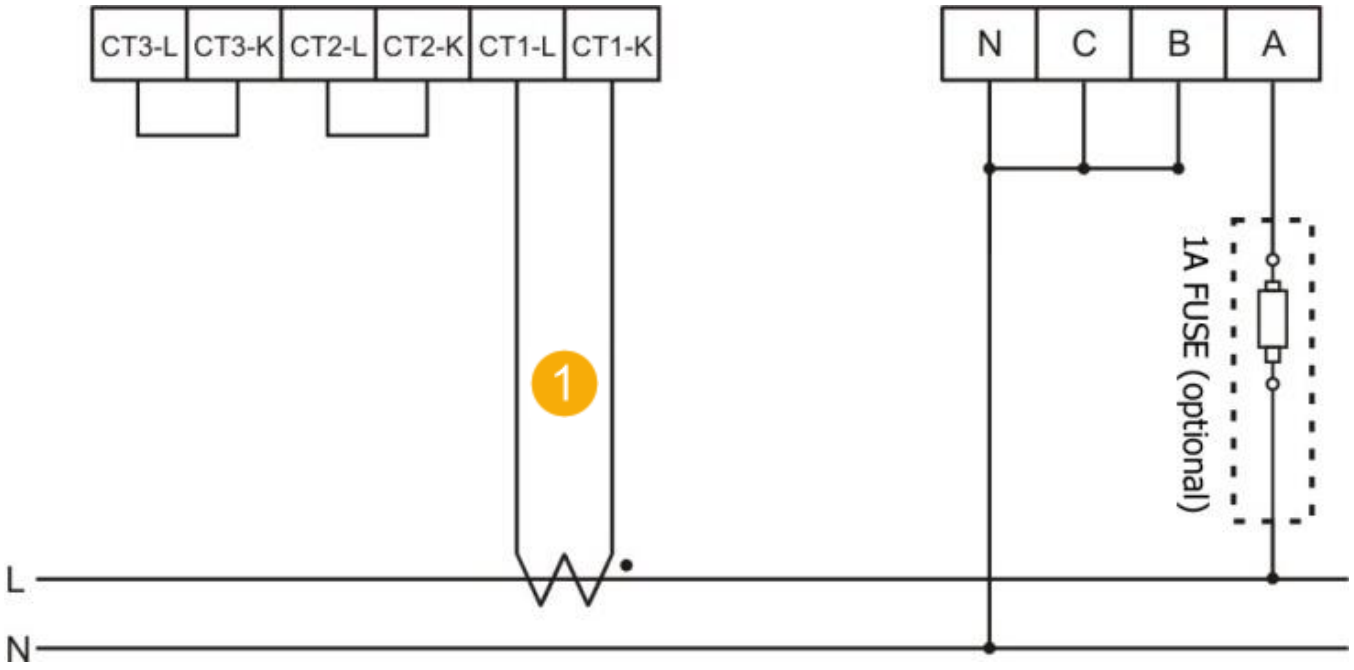
2.2.Voltage Input

1. PM-2133D-RCT series: Input Voltage up to 500V.
   For any higher Input Voltage large than 500V, please add the PT (power transformer), and Change PT RATIO setup.
2. Confirm the RST (ABC) phase sequence.

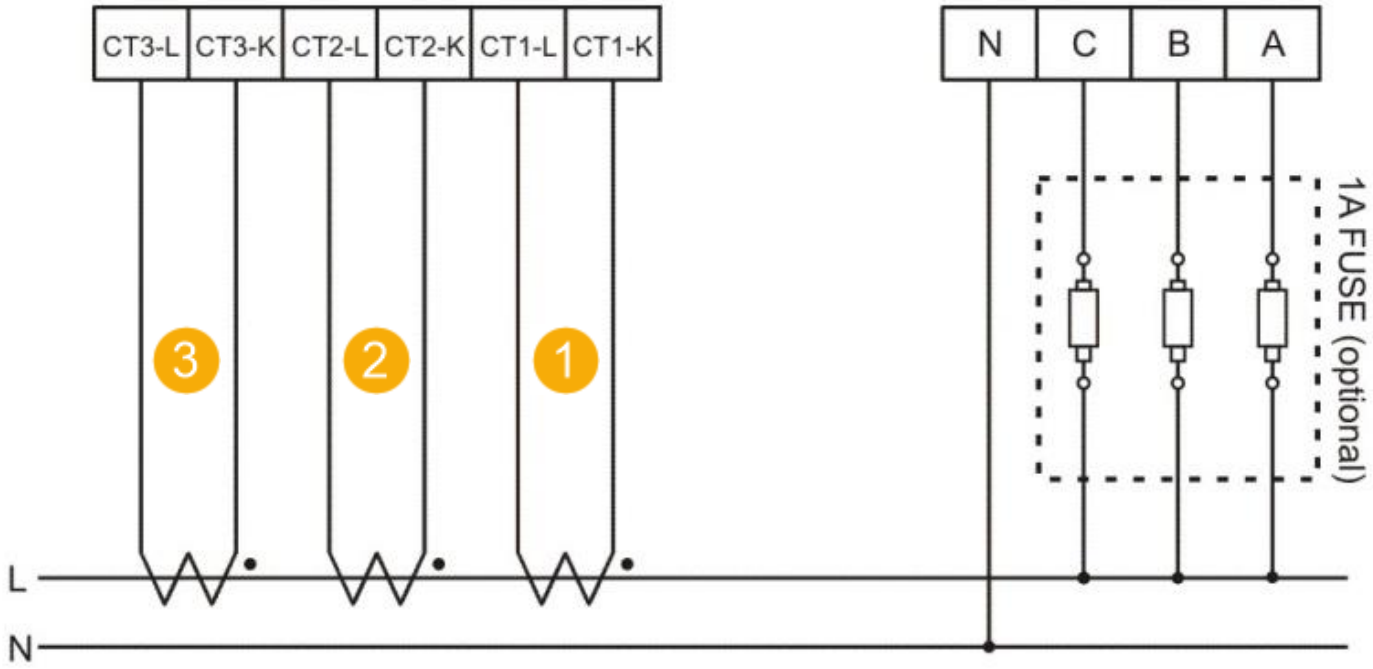
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2.3.Wiring

- 1P2W-1CT (Single-phase, Single-circuit)
  (Can be configured via software or by using the”▲” and”▼” keys)

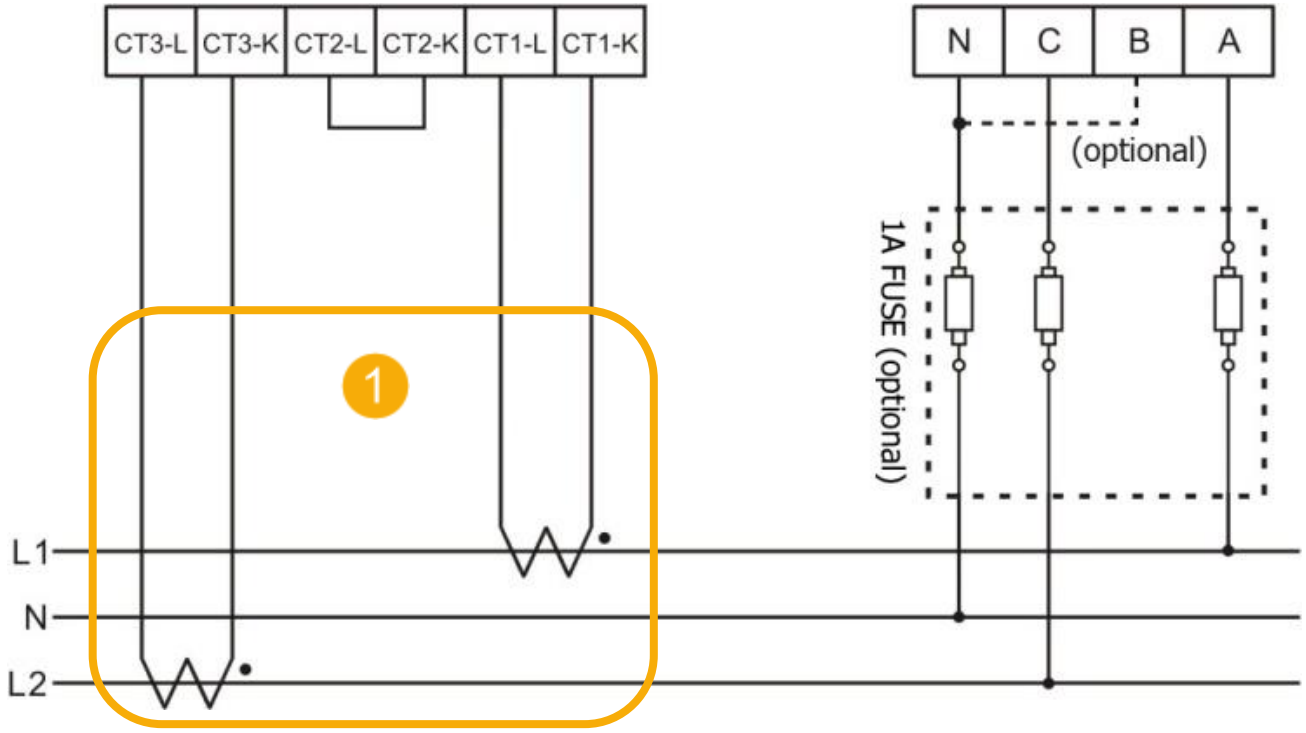


- 1P2W-3CT (Single-phase, 3-circuit)
  (Can be configured via software or by using the”▲” and”▼” keys.
  Select "1P2W-1CT" as the wiring configuration.)

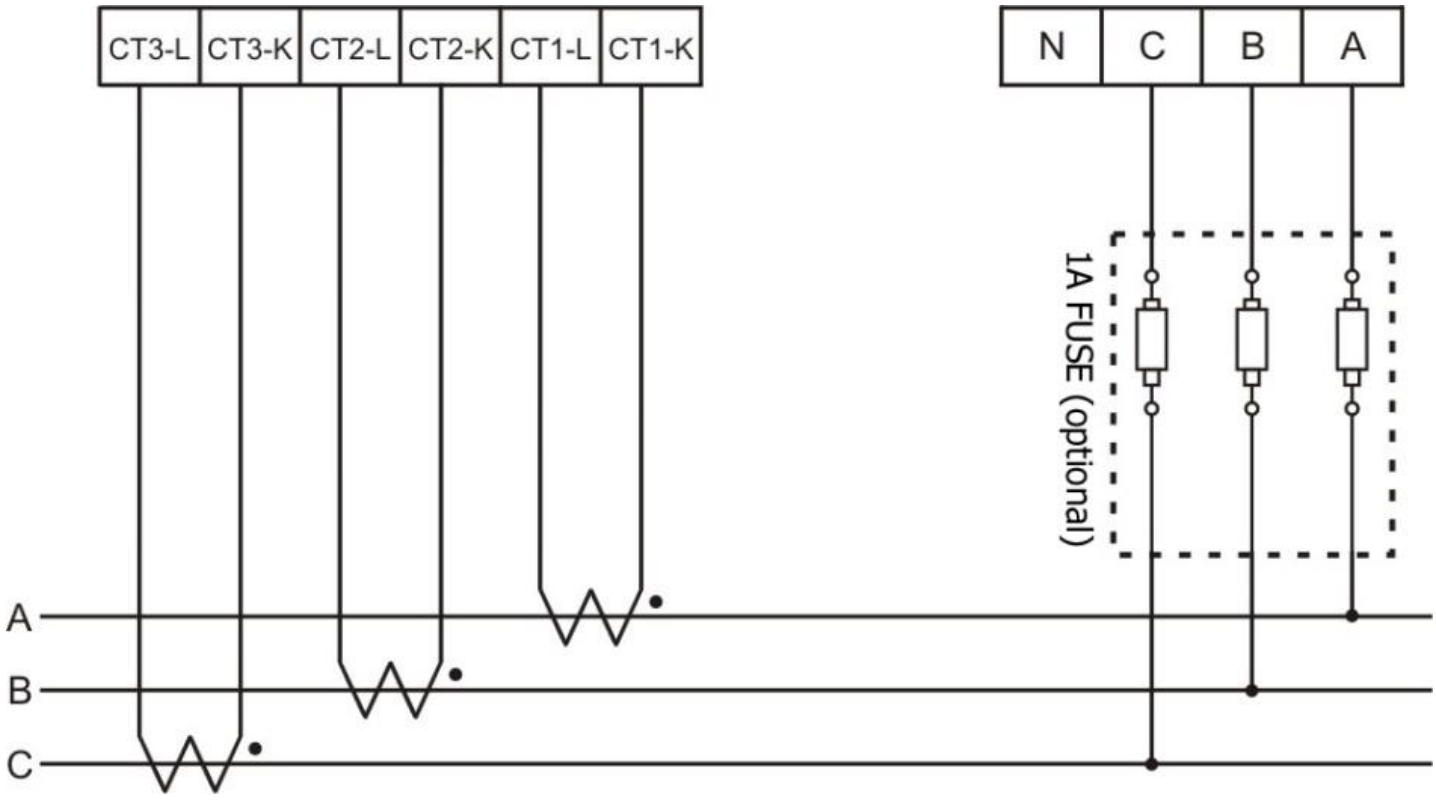


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- 1P3W-2CT (Single-phase, Single-circuit)
  (Can be configured via software or by using the”▲” and”▼” keys)

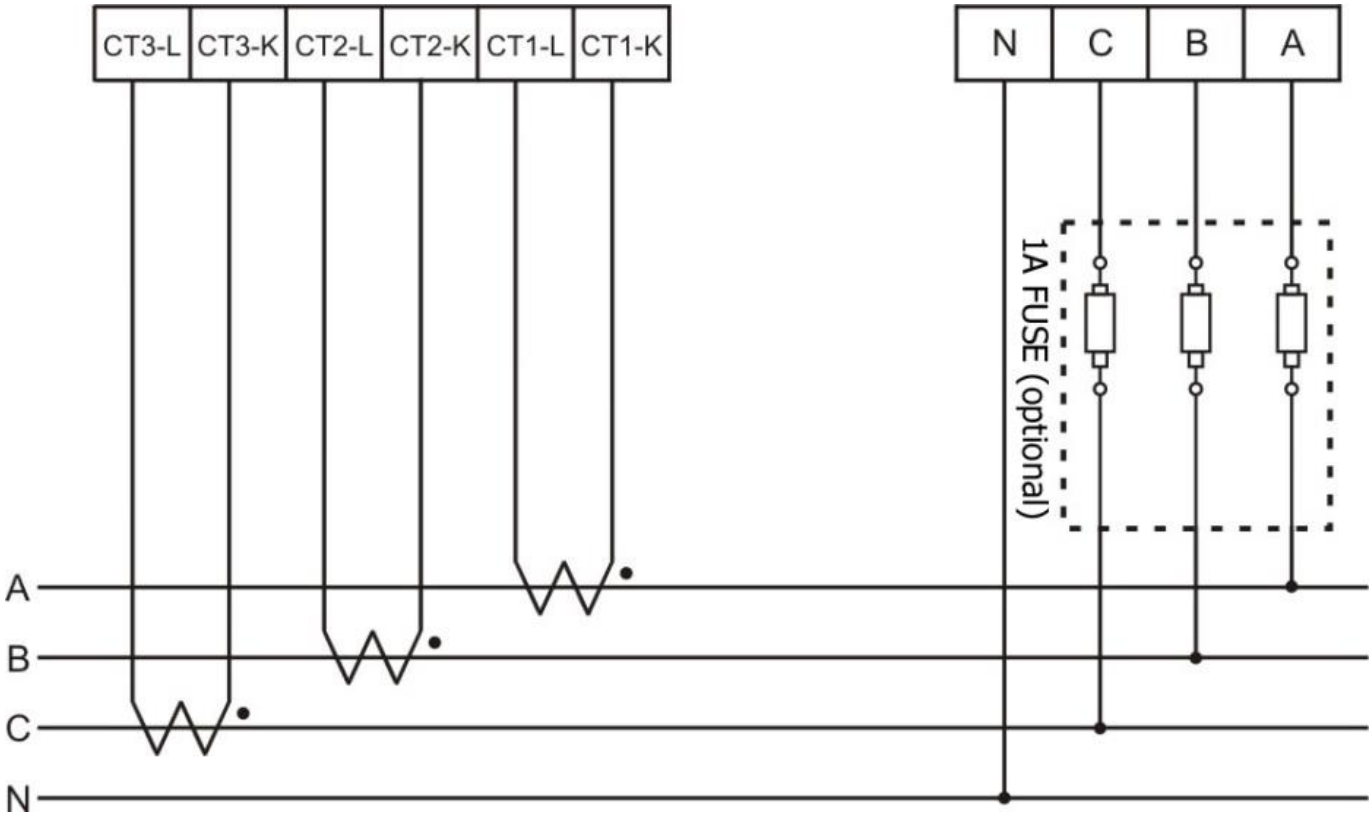


- 3P3W-3CT
  (Can be configured via software or by using the”▲” and”▼” keys)



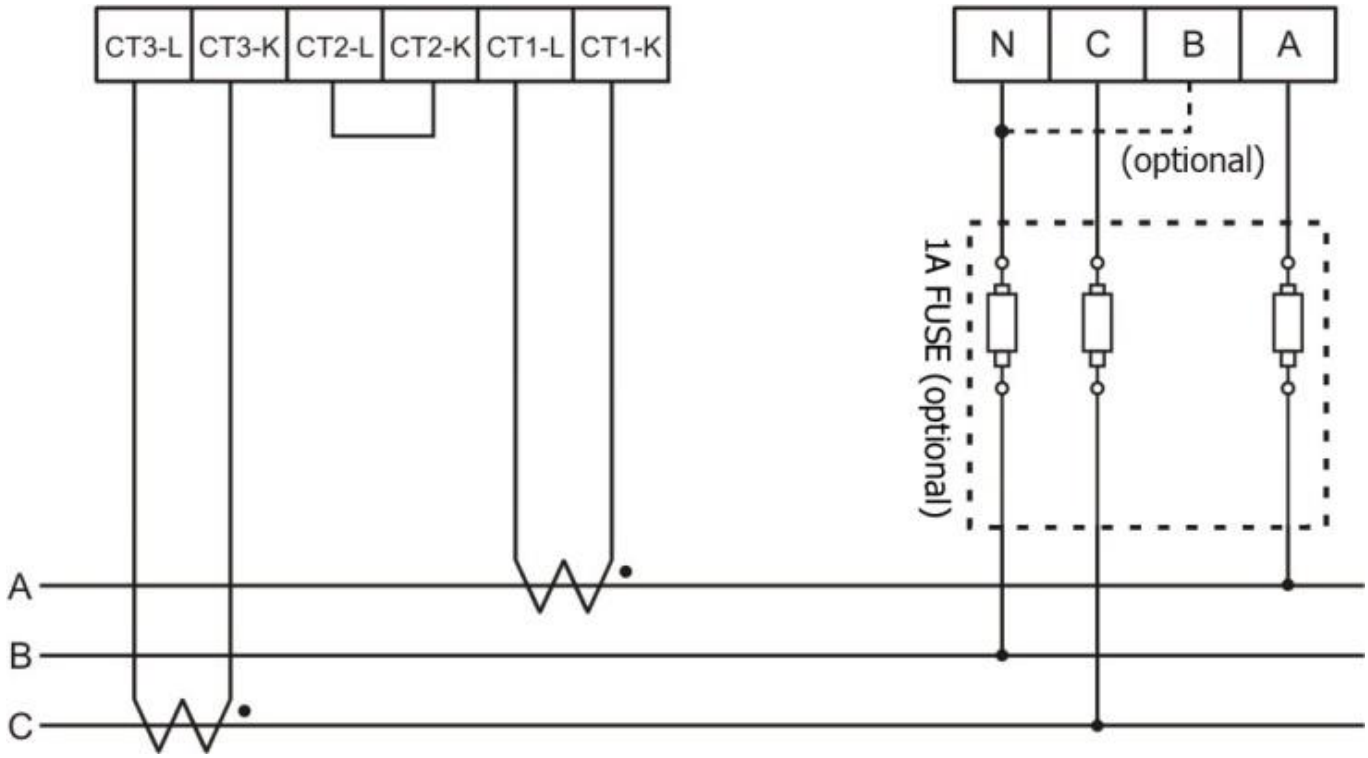
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- 3P4W-3CT
  (Can be configured via software or by using the”▲” and”▼” keys)



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- 3P3W-2CT
  (Can be configured via software or by using the”▲” and”▼” keys)



Notes:

1. If phase B is in a floating state, it may pick up induced voltage signals. To avoid this, phase B can be connected to the neutral (N) line.

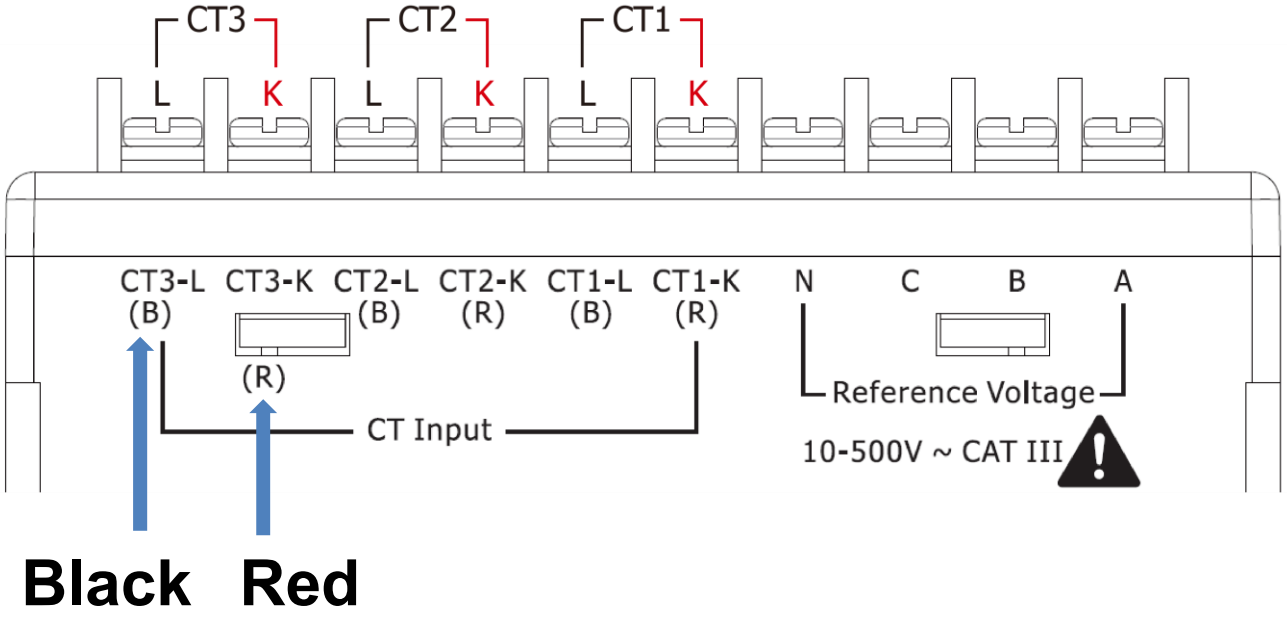
2. The 3P3W 2CT method is only suitable for **balanced three-phase systems with low harmonic distortion**. For unbalanced loads or systems with significant harmonics, the **3P3W 3CT method** is recommended for accurate measurement.
For detailed information, please refer to the Appendix “Questions and Answers” section of the manual.

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2.4.CT Connection

Please firstly check the current input terminal, and then in red black, red black, red black wire sequences (CT1-K, CT1-L, CT2-K, CT2-L, CT3-K, CT3-L). Then connect the CT's, and close the CT clip. Make sure the arrow direction sign on CT's follows current flow direction.

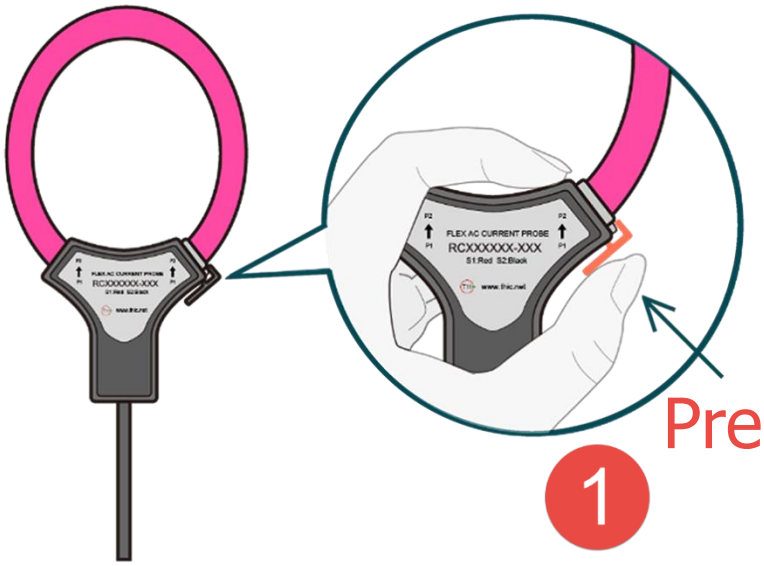




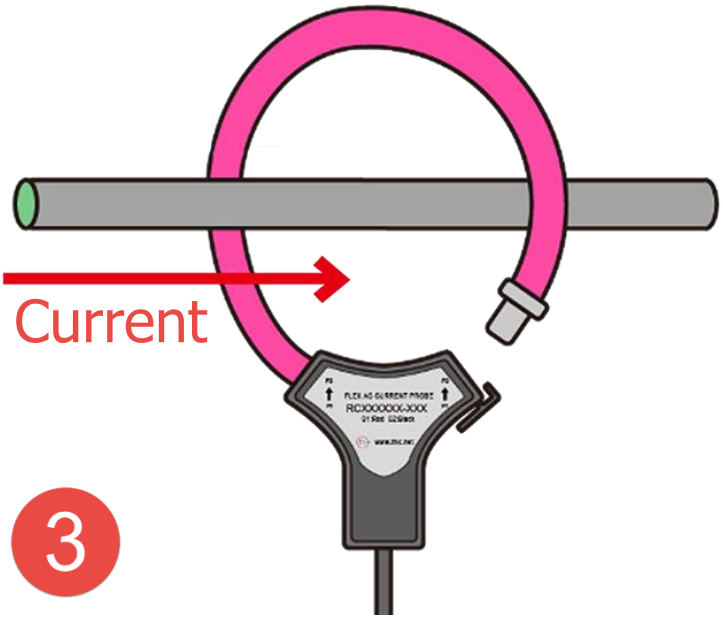
Black Red

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2.5.CT’s installation steps

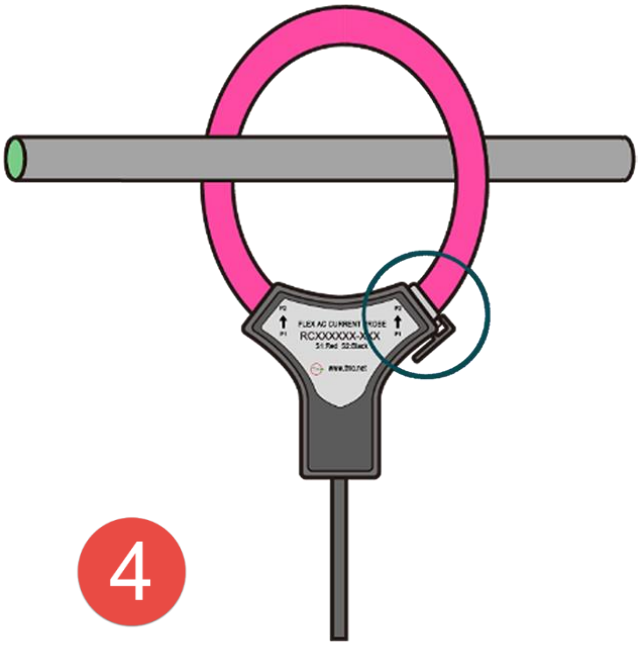






Confirm Direction





Snap the “free end” into place

2.6.CT’s installation steps Precautions

1. The ICP DAS Rogowski power meter is calibrated with the conductor positioned at the center (Position A in Figure 1.0), which is the ideal location to ensure measurement accuracy.

2. The Rogowski coil is not a completely closed circular structure, as it has a connection joint. The dashed area at Position D in Figure 1.0 indicates the location of this connection. It is known that when the measured conductor is placed closer to this area, the measurement error increases because magnetic flux variations in that section cannot be properly detected. Please avoid measuring current within the dashed area, as doing so may result in measurement errors exceeding −5%. Moreover, external magnetic flux can also affect the connection section, further increasing measurement errors.

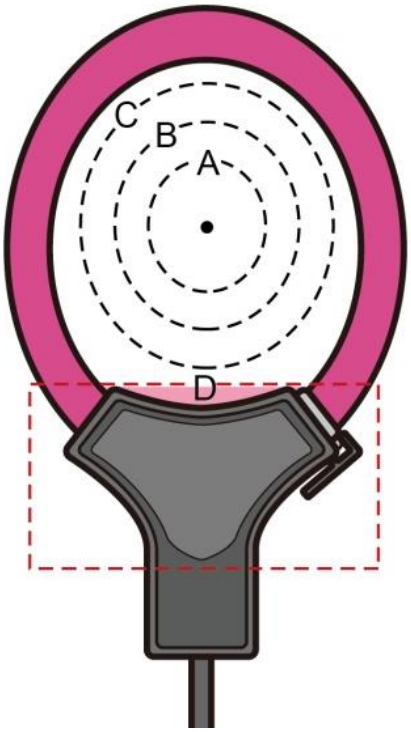


Figure 1.0

Before performing current measurements, ensure that all other current-carrying conductors, except the one being measured, are kept away from the Rogowski coil’s connection section as much as possible.

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3. In practical applications, if the measured conductor is offset from the center of the Rogowski coil, tilted, or if the conductor size is disproportionate to the coil diameter, the measurement accuracy may be affected. When the conductor is only slightly tilted or off-center, the meter can still maintain acceptable measurement accuracy, but the error will increase accordingly. To achieve higher measurement precision, it is recommended to keep the measured conductor as perpendicular to the coil as possible and ensure it passes through the center of the coil. Figure 1.1 illustrates the recommended cable tie fixation method to minimize tilt.

In Figure 1.2, when the conductor's tilt angle is large and its position is close to the coil's connection end, the measurement error becomes the greatest.

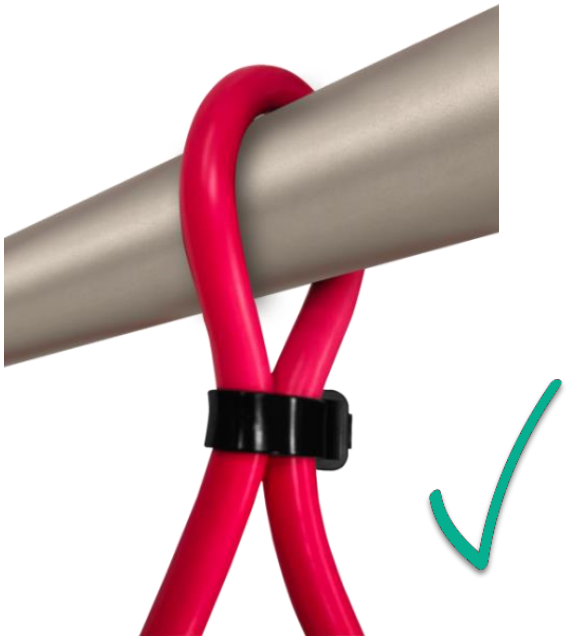


Figure 1.1



Figure 1.2

Good
Installation Method

1. The cable tie is fastened close to the wire to prevent the CT from slipping.
2. The tilt angle is small.
3. Avoid positioning the CT near location D.

Poor
Installation Method

1. Large tilt angle.
2. Too close to connection point D

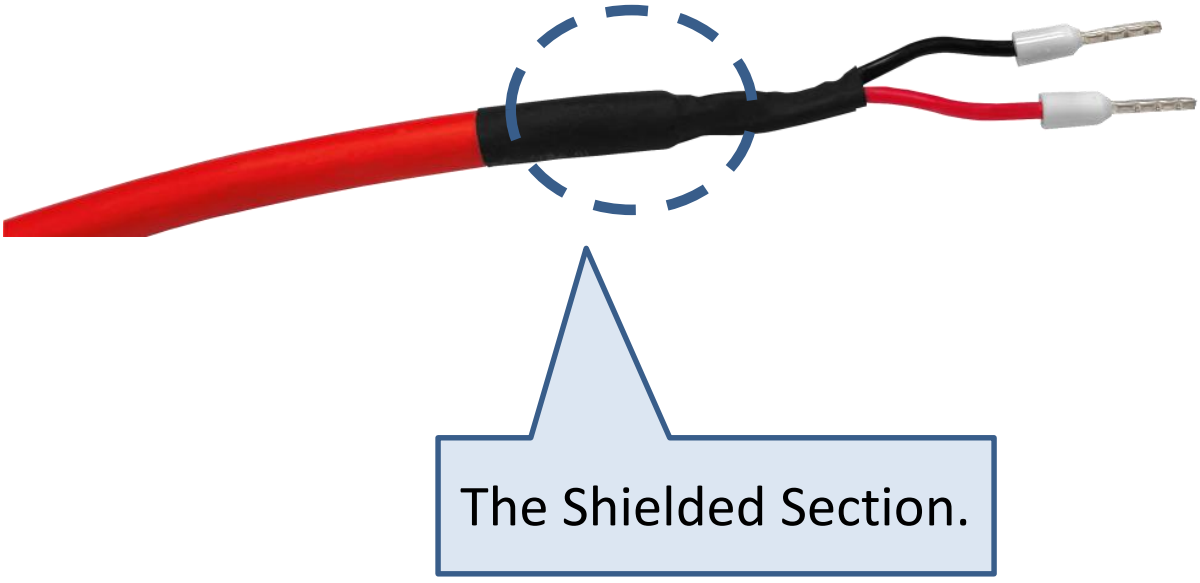
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4. At lower input currents (approximately 5%–15% of the rated current), the Rogowski coil exhibits relatively higher measurement error.
   The recommended operating current range vs. measurement accuracy is shown in the table below:

Rated Current	Recommended Operating Current Range	Low Current Range Error (5%–15% of Rated Value)	Mid-to-High Current Range Accuracy (15%–100% of Rated Value)
500A	50A ~ 500A	Higher Error (±2%～±4%)	Within ±2%; if the conductor is positioned at the center (Position A in Figure 1.0), the accuracy can be further improved to within ±1%.
1000A	50A ~ 1000A		
2000A	200A ~ 2000A		
4000A	200A ~ 4000A		

5. Do not extend the Rogowski coil's lead wires by yourself.
   Modifying the lead length will disrupt the original shielding structure, allowing external electromagnetic interference to couple into the sensing signal, which may cause waveform distortion and reduced measurement accuracy.

   If a special or extended lead length is required, please contact ICP DAS to obtain a factory-designed version with proper shielding treatment.



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3. Keypad, LED Indicator & Display

3.1.Function of LED Display, Indicator and Keypad

PM-2133D has a built-in 8-Digit LED Display to display the power data measured by the meters. The 7 LED Indicators are used to indicate the type of the power data which are currently shown on the 8-Digit LED Display, and the status of RS-485 communication (Tx/Rx).



PM-21333D also has a built-in four buttons of keypad which is used to adjust the power data which is currently shown on the LED Display or the parameters setting of PM-2133D.

Keypad	Function
▲	Move to next item be shown or decrease the settings of parameters
▼	Move to previous item be shown or increase the settings of parameters
Enter	Change LED Display to "Setup Mode" or enable the modification of parameters
Exit	Change LED Display to "Normal Mode" or disable the modification of parameters

3.2.Operation of LED Display, Indicator and Keypad

With the built-in LED Display, Indicator and Keypad, PM-2133D can display the real-time power data it measures. User can also change the setting of the power meter. The following sections describe the features provided.

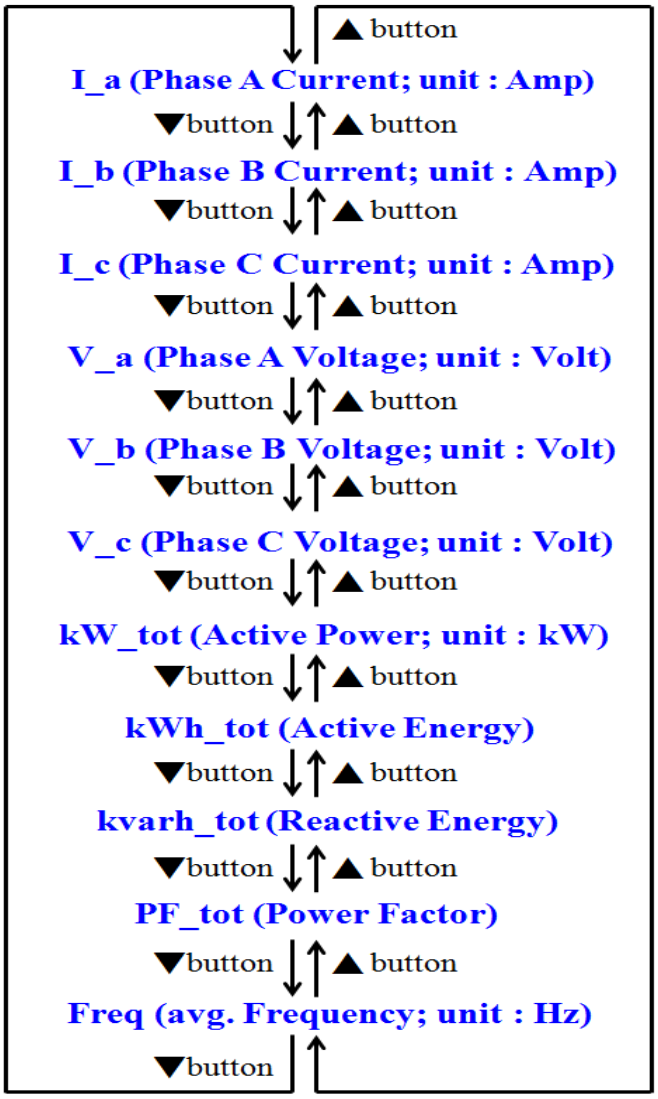
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3.2.1 Normal Mode

After power up PM-2133D, the default power data shown is power data of I_a (Phase A Current). User can press the "▲" button and "▼" button of the Keypad to select the desired power data to be displayed on PM-2133D. The corresponding LED Indicator of the power data selected will also be in "ON" status - lights up in red.



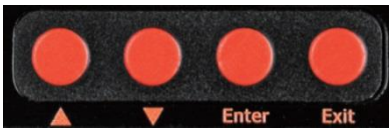
The power data provided by PM-2133D will be displayed circularly in the sequence as below:



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3.2.2 Setup Mode

User can press the buttons of Keypad to enter the Setup Mode to adjust the parameters setting of PM-2133D. The steps are as below:



i. Press the "Enter" button to enter the Setup mode, all the LED Indicators of PMD-2133D will be in "ON" status, and the LED Display panel will display 8.8.8.8.8.8.8.8..

ii. Press the "▲" button and "▼" button of the Keypad to select the parameter of PM-2133D to be modified. The settings of parameters provided by PM-2133D will be shown in sequence as below:

- 8.8.8.8.8.8.8.8. : LED Segment check (read only, cannot be modified)
- uEr 0209 : Firmware version (read only, cannot be modified).
- Ad 01 : Modbus Address setting.
  - Press the "Enter" button, the current address setting will blink.
  - Press the "▲" button and "▼" button to adjust the setting of address. The range is from 1 to 64.
- br 9600 : Modbus Baudrate setting.
  - Press the "Enter" button, the current Baudrate setting will blink.
  - Press the "▲" button and "▼" button to adjust the Baudrate setting. There are 4 options: 9600(9600), 19200(19200), 38400(38400) and 115200(115200) for selection.
- dF 8o1: Modbus Data Format setting.
  - Press the "Enter" button, the current Data Format setting will blink.
  - Press the "▲" button and "▼" button to adjust the Data Format setting. There are 6 options: 8N1(8n1; 8 data bits, None Parity, 1 stop bits), 8O1 (8o1; 8 data bits, Odd Parity, 1 stop bits;), 8E1(8E1; 8 data bits, Even Parity, 1 stop bits), 8N2(8n2; 8 data bits, None Parity, 2 stop bits), 8O2 (8o2; 8 data bits, Odd Parity, 2 stop bits;) and 8E2(8E2; 8 data bits, Even Parity, 2 stop bits) for selection.

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- PT 012.33 : PT ratio setting. The range is from 0.01 to 655.35.
  - Press the "Enter" button, the hundreds digit of the PT ratio will blink. Press the "▲" button and "▼" button to adjust the setting of hundreds digit.
  - Then press the "Enter" button, the tens digit of the PT ratio will blink. Press the "▲" button and "▼" button to adjust the setting of tens digit.
  - Press the "Enter" button, the units digit of the PT ratio will blink. Press the "▲" button and "▼" button to adjust the setting of units digit.
  - Press the "Enter" button, the tenths digit of the PT ratio will blink. Press the "▲" button and "▼" button to adjust the setting of tenths digit.
  - Press the "Enter" button, the hundredths digit of the PT ratio will blink. Press the "▲" button and "▼" button to adjust the setting of hundredths digit.
- CT 00025 : CT ratio setting. The range is from 1 to 65535.
  - Press the "Enter" button, the ten thousands digit of the CT ratio will blink. Press the "▲" button and "▼" button to adjust the setting of ten thousands digit.
  - Press the "Enter" button, the thousands digit of the CT ratio will blink. Press the "▲" button and "▼" button to adjust the setting of thousands digit.
  - Press the "Enter" button, the hundreds digit of the CT ratio will blink. Press the "▲" button and "▼" button to adjust the setting of hundreds digit.
  - Press the "Enter" button, the tens digit of the CT ratio will blink. Press the "▲" button and "▼" button to adjust the setting of tens digit.
  - Press the "Enter" button, the units digit of the CT ratio will blink. Press the "▲" button and "▼" button to adjust the setting of units digit.
- Y 1P2Y : Wiring mode setting.
  - Press the "Enter" button, the current Wiring mode setting will blink.
  - Press the "▲" button and "▼" button to adjust the Wiring mode setting. There are 5 options: 1P2W(1P2Y), 1P3W(1P3Y), 3P3W2CT (3P3Y2C), 3P3W3CT(3P3Y3C) and 3P4W3CT(3P4Y3C) for selection.

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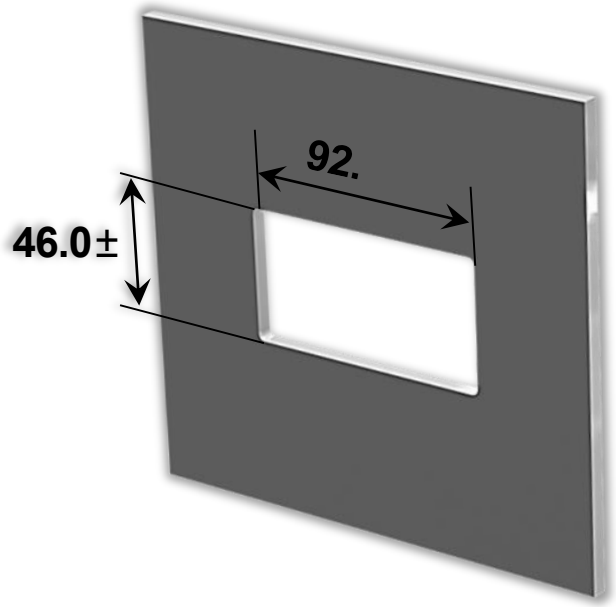
-  : Display Voltage setting.
  - Press the "Enter" button, the current Display Voltage setting will blink.
  - Press the "▲" button and "▼" button to adjust the Display Voltage setting. There are 3 options: Automatic(AUtō), "Show as Vln" (tō uLn) and "Show as Vll" (tō uLL) for selection. Please refer to PM-2133D User's Manual before change the setting of Display Voltage.

iii. After completing the setting, press the "Enter" button to save the new setting.
iv. Repeat Step ii~iii to complete all parameter settings.
v. After all parameter settings are completed, press the "Exit" button to return the Normal Mode.

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4. Mounting the PM-2133D

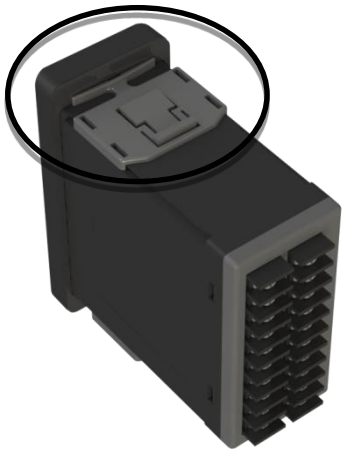
1. Prepare a panel and cut a hole
   to the specified size (unit: mm).

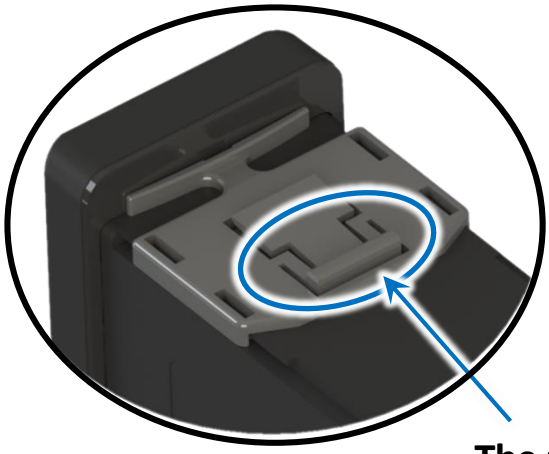


Panel thickness: 1 to 5 mm

2. Remove the latch assembly.

   i. Press the protruding pin of the latch assembly.

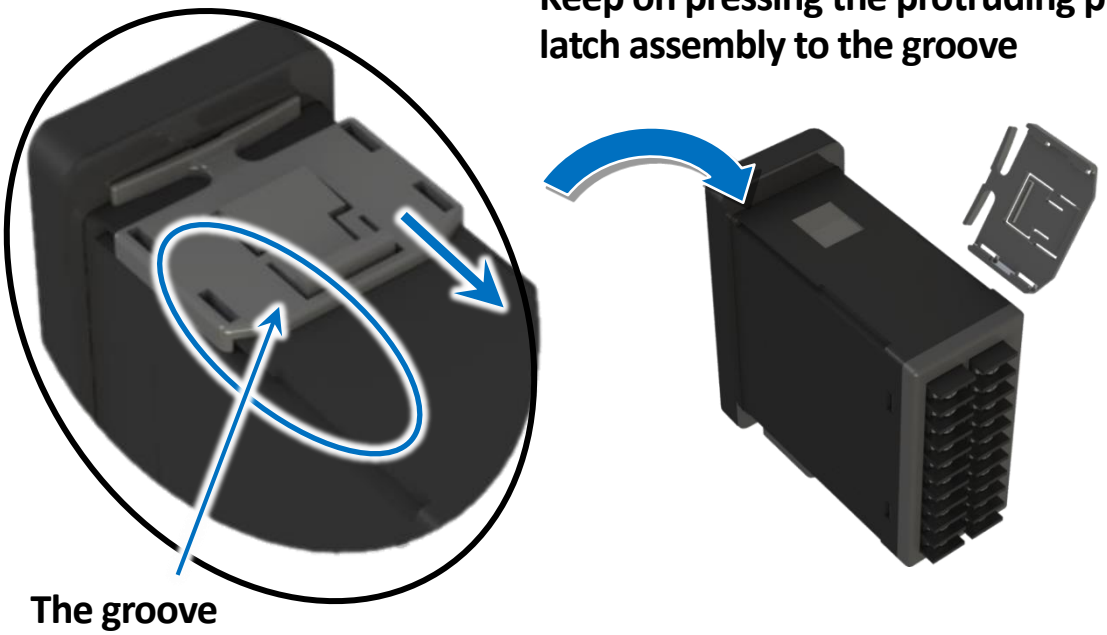




The protruding pin

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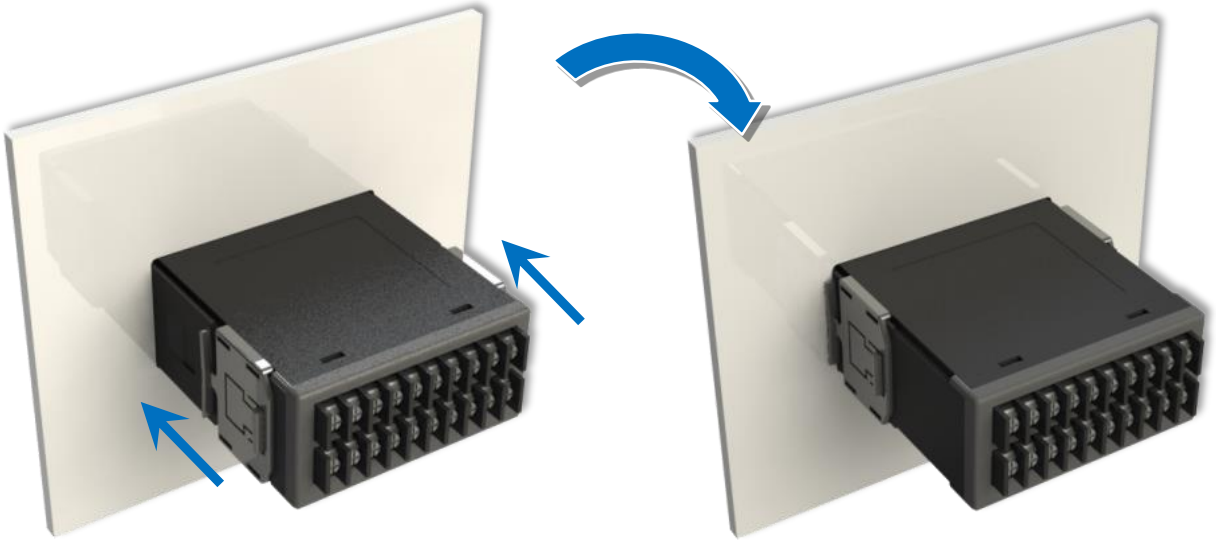
ii. Slide the latch assembly to the groove, and then remove the latch assembly.



3. Attach the PM-2133D to the cut-out hole.



4. Attach the latch assembly, and then slide the latch assembly toward the panel.



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5. Common Malfunction Analysis:

5.1. PC and meter cannot make the connection with RS-485 ?

Add the Bias Resistor on RS-485 Network for stable signal
The RS-485 master is required to provide the bias for PM-2133D series. Otherwise, the tM-SG4 or SG-785 should be added to provide the bias. All ICP DAS controllers and converters provide the bias.

5.2. What problem is while the measured readings of the power consumption（kw）is negative?

(1)First check the current input end – line terminal, （check the connection should be **CT1-K, CT1-L, CT2-K, CT2-L, CT3-K, CT3-L**）· base on red black, red black, red black follow the sequence order

(2)Check the field current direction is same as the inner arrow direction of the split type clip-on CT.



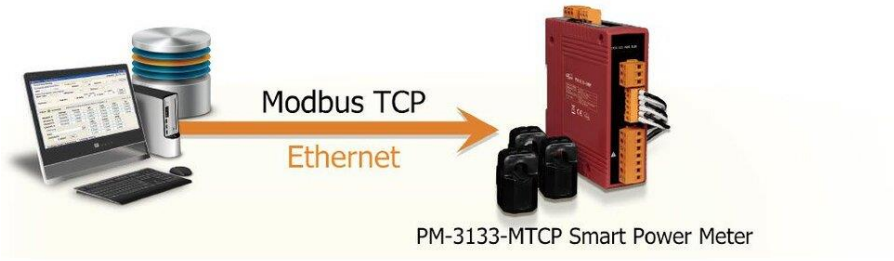
(3)Incorrect voltage or current wiring sequence may lead to phase angle calculation errors, causing the power meter to misinterpret the direction of power flow. This may also result in an abnormally low Power Factor (PF) reading.

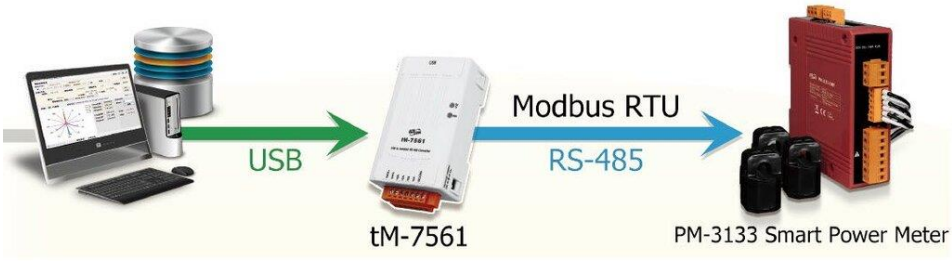
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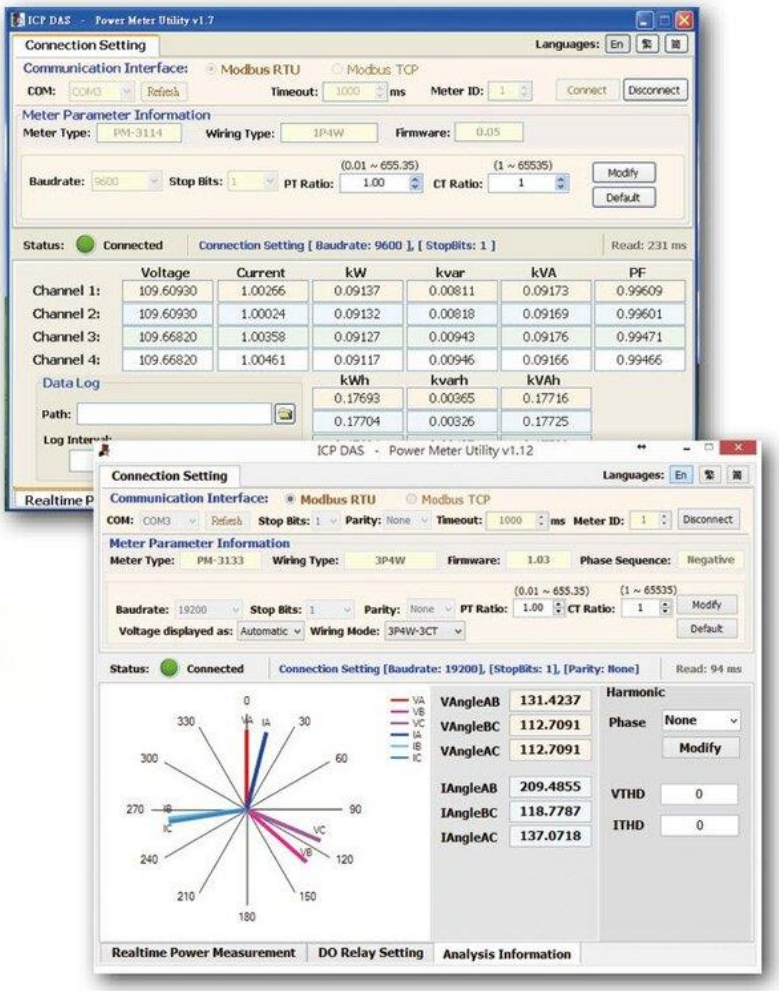
6. Power Meter Utility

Power Meter Utility has to be installed on PC and it enables to retrieve and display the power measurement values that measured by power meter via COM Port or Ethernet. The users will be able to read the power measurement values and to perform parameter settings of the meter.

Visit www.icpdas.com/, search [Power Meter Utility], and download the tool.







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