



## Precautions

- Before powering on the device, insert the 220V AC power adapter and supply the AC220V  $\pm$  10% power supply.
- Do not touch the terminals on the panel by hand when the device is energized.
- Connect the test leads correctly, set the current input mode correctly, and enter the current and voltage in the corresponding limits. Remember that the current input value must not exceed 20% of the selected terminal rating.
- clamp current transformer in the course of the use of light, must keep the jaws iron
- core face clean, not any foreign body. Jaw face can be wiped with dry silk cloth (non-alcohol and water is strictly prohibited), wipe the process should keep the core end finish.
- Remember not to connect the electronic watch pulse sampling line on the line of fire or zero line, so as not to damage the equipment.
- in the clamp-type transformer, be sure to let the current line from the circular hole of the clamp transformer, jaws to be tight, do not clip the jaws, so as not to affect the measurement accuracy.
- device button touch touch the film button, should prevent the use of sharp or nail press.
- should pay attention to water, moisture, stored in a dry place. Do not use in humid and corrosive atmospheres.
- The instrument can be reset when it is not working properly (by interference or crash) (press the [RESET] button) or restart after power on.

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## I、Product Description

ZXDN-3 multi-function energy meter field calibrator is designed for field verification single, three-phase active and reactive power and electronic energy meter and a variety of other electrical instrument design and development of a portable device. The device uses high-precision AD sampling technology and the latest digital signal processing technology, color LCD display for field calibration power meter and a variety of other electrical instrumentation provides a convenient and efficient solution. I hope you are very satisfied with this portable device.

## II、Features

1. Three-phase current, voltage, active power, reactive power, power factor, angle, frequency and other electrical parameters of high-precision measurement.
2. Three-phase active and reactive induction, electronic energy meter and a variety of other electrical instrument on-site verification.
3. On - site verification of integrated error of metering device.
4. Current input terminal and clamp table in two ways optional, clamp current transformer, making the field wiring is simple, no need to disconnect the current loop can be directly connected.
5. Vector map (also known as hexagonal map) real-time display, and according to hexagonal figure to determine the wiring error, stealing behavior in control.
6. CT to high precision measurement.
7. Store 500 sets of calibration data to be calibrated, and can communicate with PC to transfer data to PC.
8. Large-screen color LCD screen, user-friendly, Chinese menu display, can display all the parameters of a screen, there are Chinese operating tips, real-time print measurement results, easy to operate.
9. Small size, light weight, beautiful appearance, easy to carry.

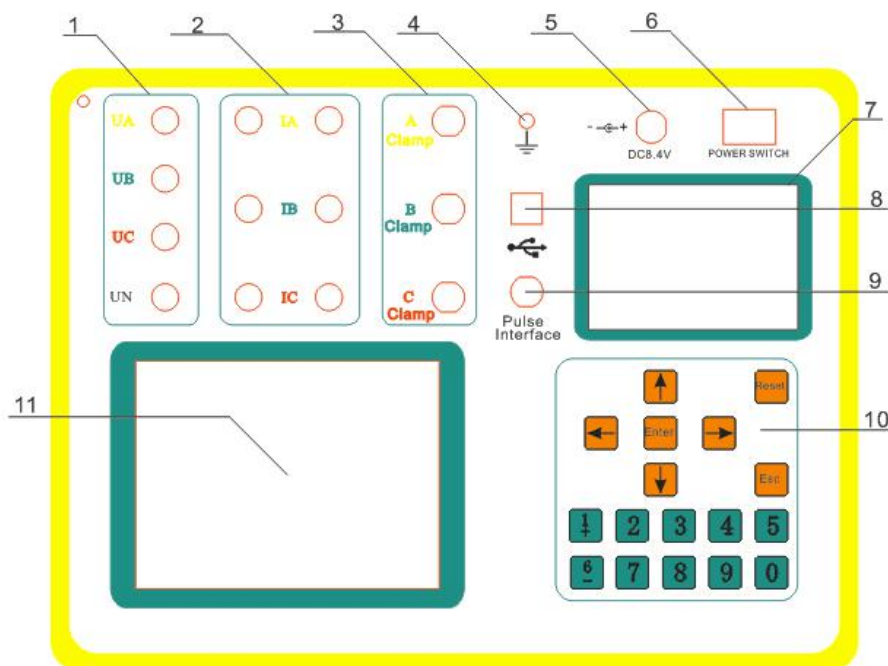
## III、Technical Indicators

1. Power measurement:  $\pm 0.1\%$  (built-in transformer);  $\pm 0.2\%$  (clamp transformer)
2. Rated voltage: 0V ~ 400V, shall not exceed the rated value of 20%

3. Rated current: built-in transformer 0 ~ 10A, clamp transformer 20A or 100A, 500A, 1000A, 2000A (large clamp table for the optional) shall not exceed the rated value of 20%
4. AC voltage RMS measurement:  $\pm 0.1\%$
5. AC current RMS measurement:  $\pm 0.1\%$  (clamp transformer  $\pm 0.2\%$ )
6. Active power:  $\pm 0.1\%$  (clamp transformer  $\pm 0.2\%$ )
7. Reactive power:  $\pm 0.3\%$  (1.0% of clamp)
8. Frequency measurement: 45Hz-65Hz ( $\pm 0.01\text{Hz}$ )
9. Angle measurement:  $0^\circ - 360^\circ$  ( $\pm 0.1^\circ$ )
10. Pulse constant: low frequency FL = 6400P / kw 路 h  
High frequency FH = 6400  $\times$  8P / kw  $\cdot$  h
11. Working power: DC8.4V  $\pm 10\%$
12. Power consumption: 8VA
13. Dielectric strength:
  - 1) Voltage, current input on the chassis of the insulation resistance  $\geq 100\text{M}\Omega$ .
  - 2) Work power input between the shell to withstand power frequency between the 1.5kV (RMS), which lasted 1 minute experiment.
14. Working temperature:  $-15^\circ\text{C} \sim 60^\circ\text{C}$
15. Relative humidity: 40% to 90%
16. Warm-up time: about 1 minute
17. Weight: 2.0Kg
18. Volume: 32  $\times$  24  $\times$  13 cm

#### IV、Panel Description

##### 1. Panel diagram



## 2. Panel introduction

- 1) UA, UB, UC, UN for the voltage input terminal, yellow for the A phase, green for the B phase, red for the C phase, black for the public low.
- 2) IA, IB, IC three-phase current series input terminal, black for the low end.
- 3) Clamp A, clamp B, clamp C three-phase current external clamp current transformer terminal block.
- 4) Ground terminal.
- 5) Charging interface.
- 6) power switch.
- 7) printer
- 8) USB communication interface.
- 9) Pulse interface: photoelectric pulse signal input and high and low frequency signal output terminals.
- 10) Operate the keyboard (9 keys in the query interface under the second function to print).
- 11) Color liquid crystal display.

## V、Instructions

### 1. Boot

- a. When the power switch is turned on, the LCD screen displays the main menu interface:  
(see Figure 1)



Figure 1

In the main screen, press  $\uparrow$   $\downarrow$   $\leftarrow$   $\rightarrow$  arrow to select the desired menu and press "OK" to enter the corresponding menu. Press "1 +" key to increase the brightness of a level, press the "6" key is to reduce the first level of brightness. In the data query interface, press "9" to print the test result.

## 2. Basic settings

You must press the "OK" button to enter the setting function, then press the "confirm" button again to start setting, press "Cancel" to set the function, Key to return.

- 1) Set the line: When the line is displayed in reverse and prompts, press " $\leftarrow$   $\rightarrow$ " to change the corresponding option to "check". Press "OK" to select the option and save it, then press " $\downarrow$ " Go to the next setting. Press the "Cancel" button to save the settings and exit. If you press " $\downarrow$ ", you will be able to enter the next setting.
- 2) Set the current input mode: operate the same as above.
- 3) Set the time: set the time according to the location of the cursor input the corresponding year / month / day, usually each input 2 digits. After entering "OK", enter the next item until the setting is completed. After all the settings are set, press the "OK" button, the prompt settings have been saved, and then "OK" to return to the main menu. These parameters will be valid for long term (after power is still valid), to be changed to be reset.

## 3. Electrical parameter measurement function

In the main menu under the color display [power] press the "confirm" button to enter

the electrical parameter measurement function, the use of the field calibrator electrical parameter measurement function, can be used to check the other electrical instrument calibration. Measure once every 0.5 seconds. Can display all current parameters such as current and voltage power. Single-phase voltage or current measurement, the input can be optional one phase. Power, angle, power factor measurement, can choose a group (with the same phase voltage, current input).

Note: In the measurement of electrical parameters, pay attention to the voltage and current input terminal limits and methods to ensure that the correct set current input and input does not exceed the selected terminal limit.

#### **4. Energy meter calibration**

Energy meter calibration is the main function of the instrument, the use of electrical parameters and the same measurement, it should first turn on the calibrator power supply, after access to voltage, current lines and sampling devices, and then follow the steps to verify.

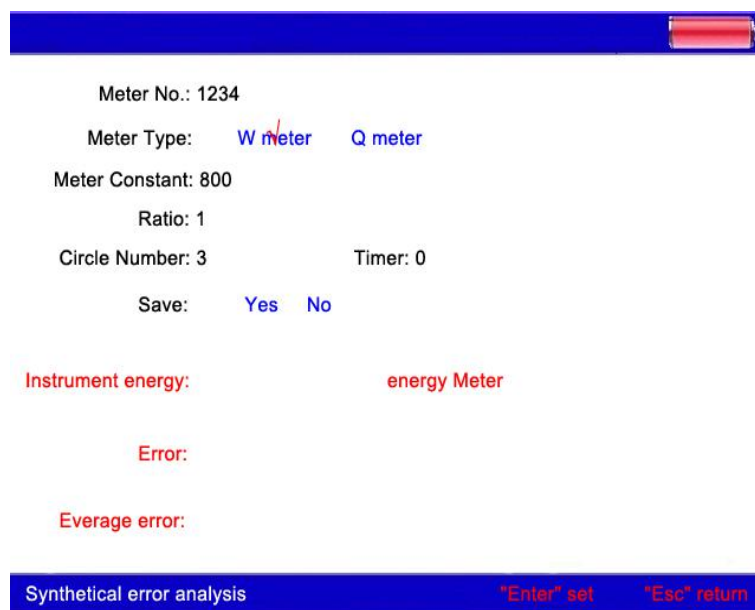
In the main menu under the anti-color display 【calibration】 press the "OK" button to enter the school table function, this time will display the following picture. At this point if the meter is moving, then the value of the count will increase after the meter every lap plus 1, indicating that the pulse sampling device has been connected well. Press "OK" button to enter the settings:

- 1) Set the table number: When the table number is displayed in reverse and the cursor is flashing, enter the maximum number of 8 digits. Press "↓" to enter the next setting.
- 2) Set the constant: When the table constant is displayed in reverse and the cursor is flashing, enter the table constant (this value is on the meter nameplate) and press "↓" to enter the next setting.
- 3) Table type: When the table type reverse display, press ← → key to select the appropriate option, that is, active meter or reactive meter, and press "↓" key to enter the next setting.
- 4) Change ratio: If the measurement error is measured for the metering device, the CT ratio is the ratio of the CT used in the metering device. In general, enter 1.
- 5) Method: Press ← → to select the corresponding option, photoelectric sampling mode or manual mode, and press "OK" key to enter the next setting. The general use of



photoelectric sampling, manual mode will have a greater error.

- 6) Lap: This value determines how many times the meter takes the instrument to calculate the error, the setting range is 1-99, the greater the value, the more accurate the error, but the corresponding calibration time is longer.
- 7) If the value is set to "Yes", then the current calibration table and the measurement of the electrical parameters, vector measurements will be stored in the instrument chip, and in the query menu under the query, if set to "no ", Will not store all the results of this measurement. Select the appropriate parameters and then press the "OK" button, then officially start the calibration interface as shown in the figure.

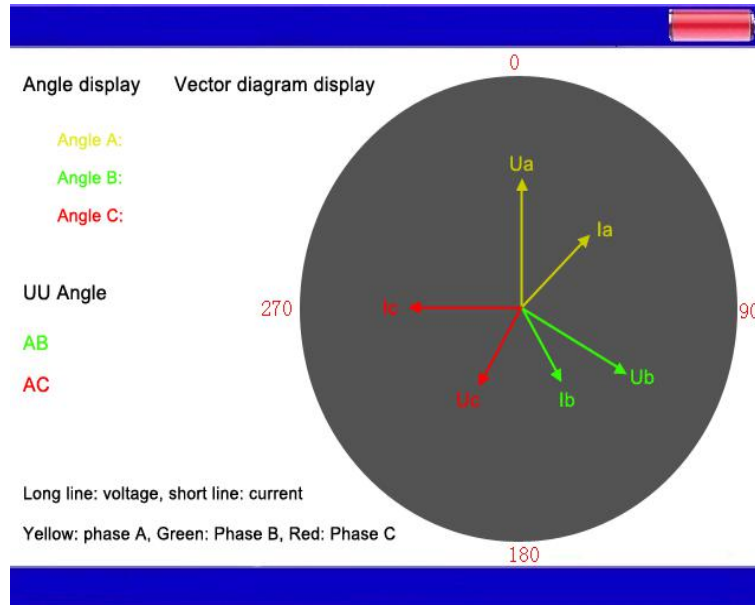


In the calibration process, the instrument power display value represents the standard energy value measured in this instrument, the unit is watts / hour, the meter power is displayed according to the meter pulse calculated energy value, the error will be in the last line Show that the first one for the latest calculation of the error, the right followed by the previous error value, a total of three, for observation and analysis.

Note: If you find that the measured error value is too large, you should first check the calibration table is set and wiring is correct, you can go to the [power] measurement state to see whether the phase power is positive, if negative is the current direction Reversed, and then check the photoelectric sampler sampling is normal, whether the current line clamped in the clamp current transformer jaws, clamp current transformer jaws are clean. When the power is negative, error measurement can not be made.

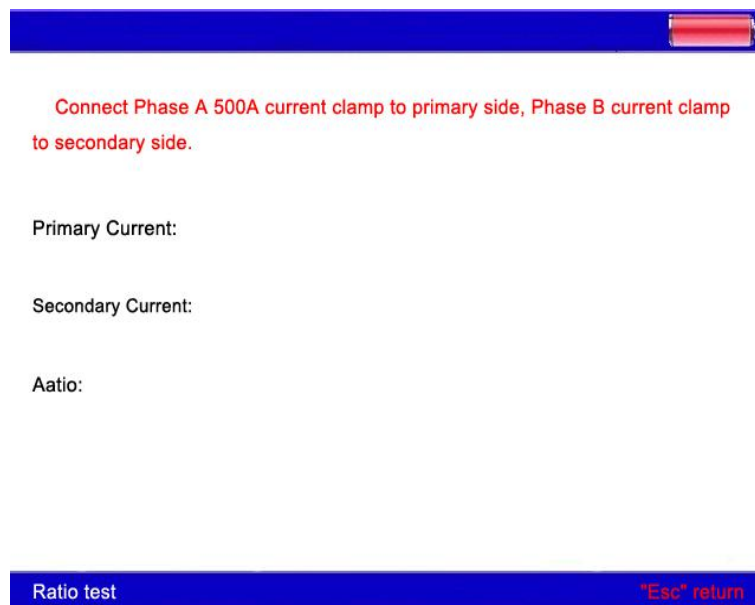
## 5.Vector diagram display

Press the "OK" button to enter the angle measurement function, then the hexagonal figure will be displayed and the voltage and current phase angle and the three-phase voltage angle of the three phases will be displayed on the left side. For the indirect judgment wiring is correct as shown.



## 6.CT ratio measurement

In the main menu under the reverse color display **【ratio】** press the "confirm" button to enter the variable ratio measurement function, shown below. Follow the on-screen instructions to measure the CT ratio. In this case, the current input mode in the setup menu must be placed in the third position, as shown in the figure.



## 7.Store and query

The instrument can be 500 tables of all the measurement data (including hexagonal)

storage machine, available at any time out of the query.

In the main menu under the reverse display 【query】 press the "confirm" button to enter the query function, this time will have been recorded records. Press the "5" key to delete the record, then delete all records.

The machine can also import data through the serial port into the computer for query and save. In the PC to install the host computer software can be; Note that the instrument in the query menu to communicate!

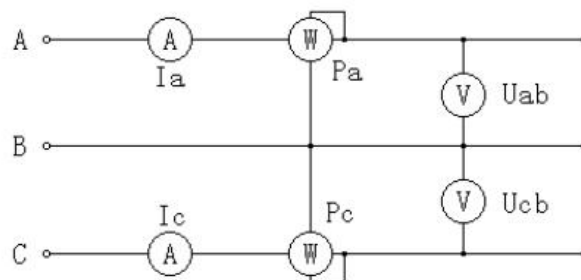
## VI、Wiring Principle

### 1. Principle of meter wiring

#### 1) Three-phase three-wire and three-phase four-line measurement principle

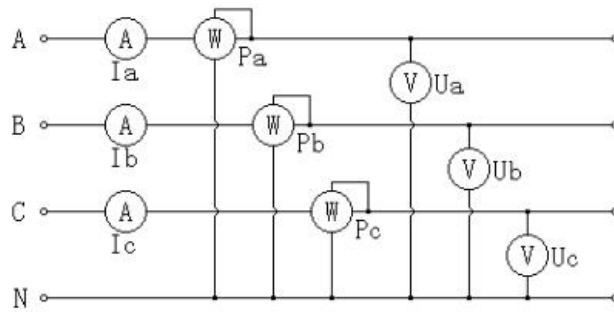
Introduction:

Three-phase three-wire measurement refers to the use of two power components to achieve the three-phase line measurement, the equivalent of two separate ammeter in the circuit (in series, A, C two-phase), two voltmeter (respectively in parallel Between and CB) and two power meters (current coil connected in series, A, C phase, voltage coil in parallel between AB and CB), the measurement principle as shown:



Three - phase three - line measurement principle

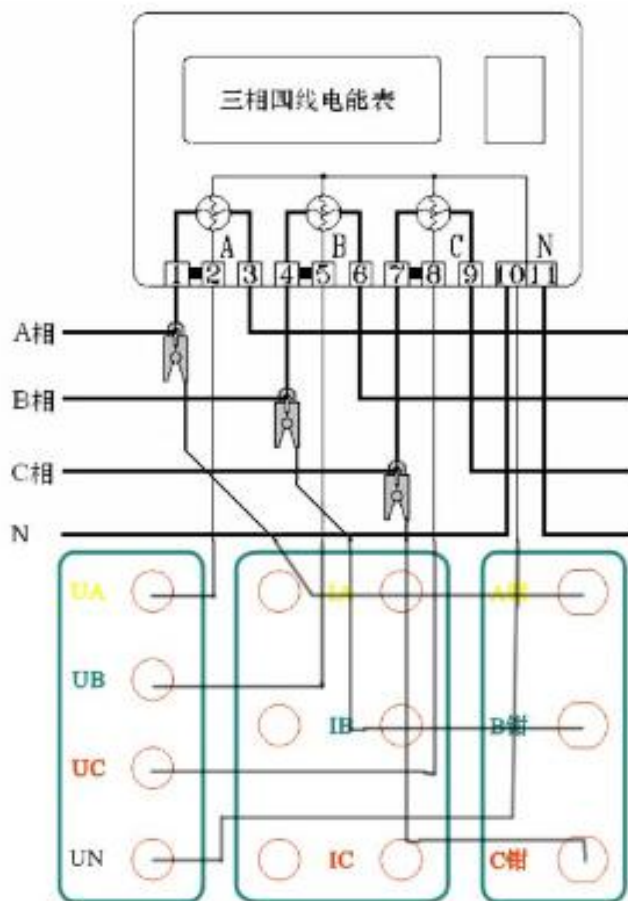
Three-phase four-wire measurement refers to the use of three power components to achieve the three-phase line measurement, the equivalent of the circuit were connected to three ammeter (respectively, in series, A, B, C three-phase), three voltmeter (respectively, in parallel, in the A, B, C between the relative N phase) and three power meter (current coil were connected in series, A, B, C phase, the voltage coil were parallel in A, B, C between N), The measurement principle is shown in the figure:



Three - phase four - wire measurement principle

2. Three - phase four - wire low - voltage watt - hour meter access board wiring

Three-phase four-wire low-voltage energy meter by the clamp transformer wiring check as follows:



Three - phase four - wire clamp wiring diagram

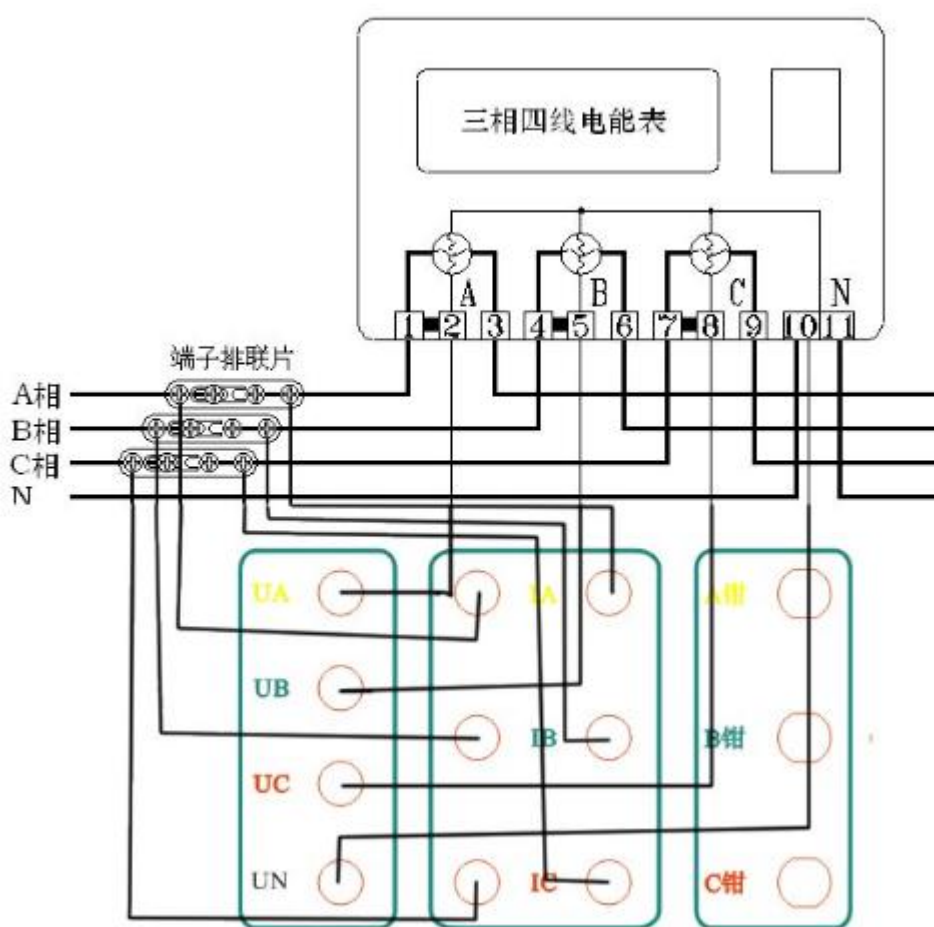
The UA, UB, UC, UN voltage terminals are connected to the corresponding panel of the instrument panel, and the alligator clips at the end of the voltage line are connected to the A, B, C, N Phase voltage line; then the phase of the clamp transformer inserted into the corresponding label on the interface, and then use the clamp transformer to catch the

corresponding phase of the current line can be. (Note: the polarity must be correct, the current direction in accordance with the clamp current transformer arrow pointing to the same line).

Open the instrument switch, first in accordance with the measured parameters of the table will be set to set the appropriate parameters in the screen, and then, you can enter the appropriate interface for testing.

### 3. Three - phase four - wire low - voltage energy meter by the internal CT access test

Three-phase four-wire low-voltage energy meter by the internal CT access wiring check as shown:



Three - phase four - wire internal CT wiring diagram

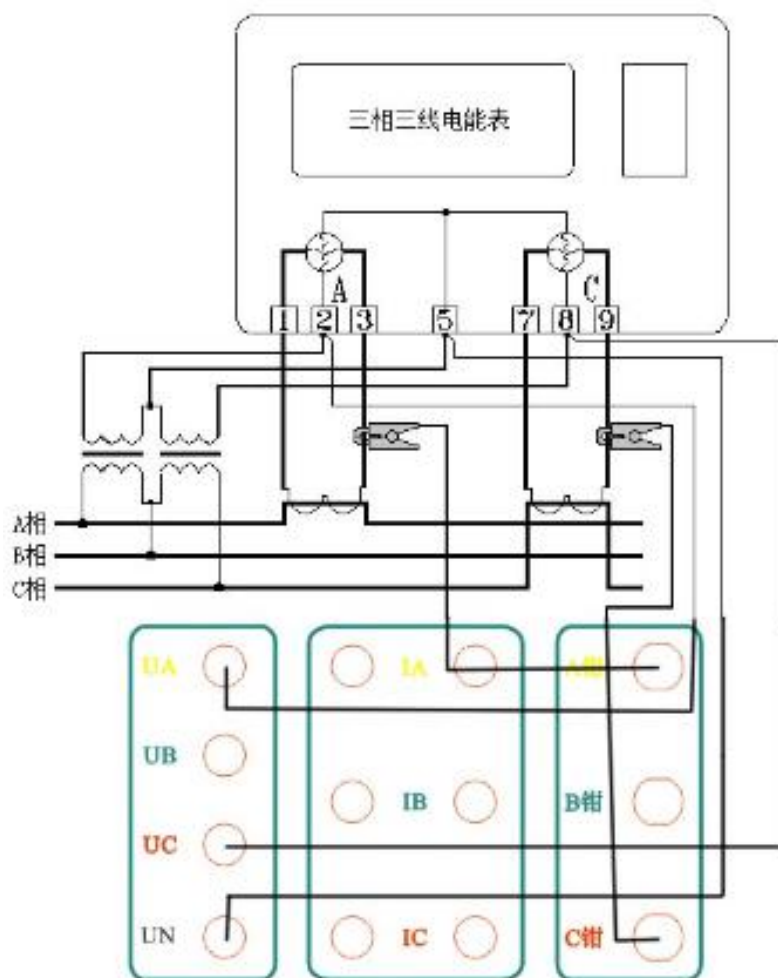
The UA, UB, UC, UN voltage terminals are connected to the corresponding panel of the instrument panel, and the alligator clips at the end of the voltage line are connected to the A, B, C, N Phase voltage on the line; the current line of the first end of the plug by color to the instrument panel corresponding to the current terminal IA, IB, IC, in accordance with the yellow-green red three-color current connected to the positive side, black current negative terminal, current line end (Or I / connected to the side of the meter), and then open the terminal strip of the terminal block.

Open the instrument switch, first in accordance with the measured parameters of the table will be set to set the appropriate parameters in the screen, and then, you can enter the appropriate interface for testing.

At present there is such a terminal block wiring has been rare, for no terminal block can only take clamp access method.

#### 4. Three - phase three - wire high - voltage energy meter by the clamp table access wiring

Three-phase three-wire high-voltage energy meter by the clamp access wiring as shown:



Three - phase three - wire clamp wiring diagram

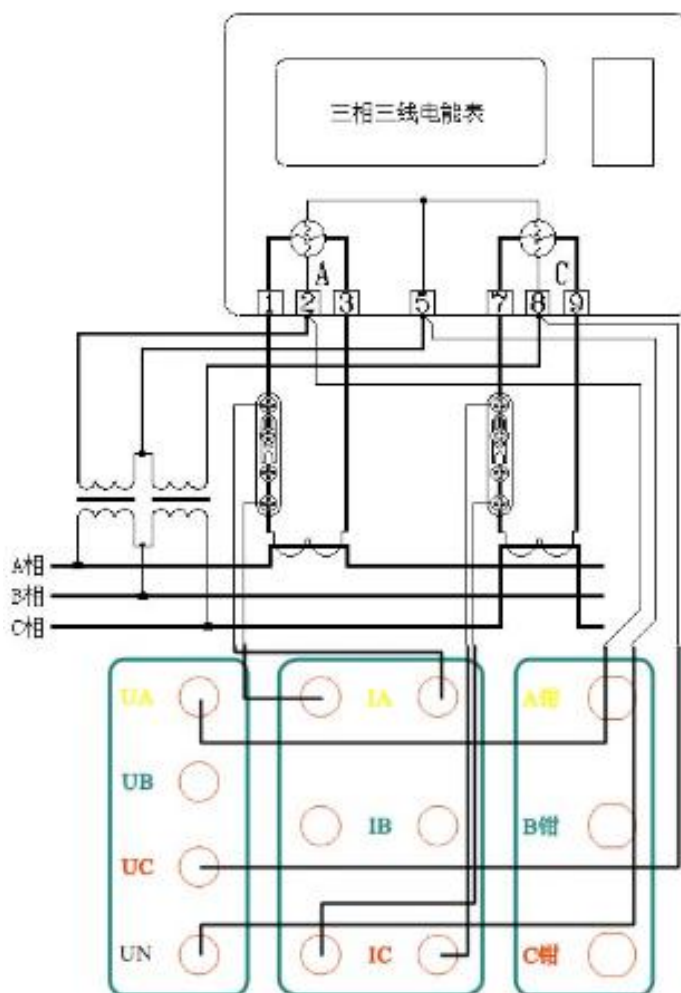
(I.e, the yellow plug is connected to the voltage terminal UA, the green plug is connected to the voltage terminal UN, and then the yellow, green and red plug of the voltage line are connected with the corresponding UA, UN, Red stick to the voltage terminal UC, UB terminal is not wired or shorted with the UN), the end of the voltage line of yellow, green and red alligator clip by color were received at the end of the measured table A, B, C three Voltage line; and then A, C two-phase clamp transformer inserted into the

corresponding label on the interface, and then use the clamp transformer to catch the corresponding phase of the current line can be. (Note: the polarity must be correct, the current direction in accordance with the clamp current transformer arrow pointing to the same line).

Open the instrument switch, first in accordance with the measured parameters of the table will be set to set the appropriate parameters in the screen, and then, you can enter the appropriate interface for testing.

#### 5. Three-phase three-wire high-pressure meter by the internal CT direct access wiring

Three-phase three-wire high-voltage energy meter through the internal CT access wiring as shown:



Three - phase three - wire internal CT wiring diagram

(I.e, the yellow plug is connected to the voltage terminal UA, the green plug is connected to the voltage terminal UN, and then the yellow, green and red plug of the voltage line are connected with the corresponding UA, UN, Red sticks connected to the voltage terminal UC, UB terminal is not connected or shorted with the UN), the end of the

voltage line of yellow, green, red alligator clip by color were received at the end of the measured table A, B, C three Voltage line; the current line of the first end A, C two-phase plug bar by color connected to the instrument panel corresponding to the current terminal (B phase line not used), the polarity of the terminal marked current positive, unmarked (I + connected to the side of the meter, I-connected to the side of the meter), and then open the terminal strip of the terminal block.

Open the instrument switch, first in accordance with the measured parameters of the table will be set to set the appropriate parameters in the screen, and then, you can enter the appropriate interface for testing.

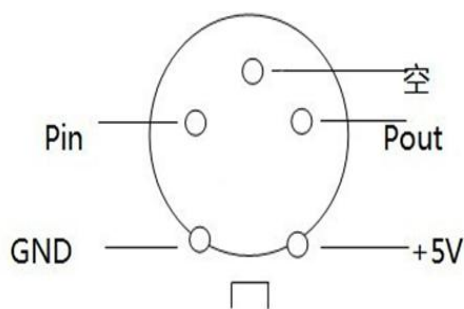
Internal CT direct access to the way to achieve the highest test accuracy, but the wiring is more cumbersome.

## 6. Single - phase energy meter wiring

Single-phase energy meter only need to connect a voltage  $U_a$  and a current  $I_a$ , the same wiring can be measured. (Wiring is simple, no wiring diagram is given).

## 7. Other functional wiring and so on

Note: Sampling devices include photoelectric samplers, electronic watch pulse sampling lines. Check the energy meter according to the type of calibration table, select the appropriate sampling device and the photoelectric pulse signal input and high and low frequency signal output terminal connected to check the mechanical table to open the sampler fill light, electronic is not Open higher sensitivity (Interface definition diagram):



(Interface definition diagram)

Its meaning is as follows:

Pin is the pulse input of the photoelectric sampler. The pulse output line of the electronic energy meter can also be input to the instrument through the mouth. Pout is the power pulse of the instrument output, which can be used to check the error of the instrument.



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## VII、 Calibration Of Basic Electrical Error Of Instrument

### 1. Positive law

Take the optoelectronic pulse signal input on the panel and the Pout and GND of the high and low frequency signal output terminals, input the corresponding terminal of the standard table, and check the error of the calibrator. The error value of the standard meter is the calibration instrument Relative error value. The low frequency constant of the calibrator is 6400r / KW h.

### 2. Anti-school law

Take the low-frequency output signal Pout and the ground of the standard energy meter, and enter the low-frequency constant of the standard energy meter after inputting the photoelectric pulse signal input on the calibration instrument panel and the Pin terminal and the GND terminal of the high and low frequency signal output terminal Test. The error values read from the calibrator using this calibration method are the same as the absolute values of the calibrator, but the opposite is true.

## VIII、 Common Faults And Handling Methods

1. Parameter measurement, the display value and the actual value of a large difference, you should check the access voltage, the current range and the actual match.
2. When the parameter is measured, the displayed reading is unstable. Check whether there is a voltage input. In the case of no voltage input, the reading displayed when measuring current will be unstable. In the case of a voltage input, the displayed readings are unstable and the load is unstable.
3. In the school table, if the error out of the test value is very large, there are several possible reasons:
  - 1) Wrong wiring, phase voltage and phase current does not correspond one by one, or a phase power is negative.
  - 2) The sampler is misplaced (ie, multi-sampled or less sampled), and the position or sensitivity of the photoelectric sampler needs to be readjusted.
  - 3) The current input mode is not correct or three-phase three-wire, three-phase four-wire way is not correct.
  - 4) Clamp current transformer core end is too dirty caused by the sampling current is too

small.

- 5) Clamp current transformer core end face is not fully closed.
- 6) Calibration table meter constant input error.
- 7) The calibration ratio of the calibrated device is incorrect.
- 8) The field load fluctuates too much, or has strong electromagnetic interference.

## IX、Random Attachments

### 1. 标配附件

- |                |     |
|----------------|-----|
| a. 测试导线        | 1 套 |
| b. 吸盘式光电采样器    | 1 个 |
| c. 电子表脉冲采样线    | 1 根 |
| d. 通讯线         | 1 根 |
| e. 光盘          | 1 张 |
| f. 20A 钳表      | 3 只 |
| g. 充电器 8.4V/1A | 1 个 |
| h. 配线包         | 1 个 |
| i. 说明书         | 1 本 |
| j. 检测报告        | 1 份 |
| k. 合格证/保修卡     | 1 张 |

### 2. 选购附件

100A 钳表、500A 钳表、1000A 钳表