# Instruction

three-phase Intelligent electricparameter measuring instrument

PZ9930 SERIES

## Preface

Thank you for purchasing our product. Before using this product, please read the operation instructions to ensure that the user can use this product correctly. And check the packing list to confirm the products and accessories. If there is any contact, please contact the company or agent.

## Note:

1. Because of the version update, some change about the instruction content and the instrument used, will not be notified.
2. The manual is to be confirmed, and it has been expressed in the simplest way for the user's understanding. If you find that some of the content is not right or not clear, please contact with the company or Contact.

Version: V1.4

## Caution:

For your personal safety and proper use of this instrument, please be sure to comply with the specification requirements for operation and measure. And pay strict attention to the following safety regulations.

1. The Protection of the Power and Grounding. The working power supply of this product is AC 86-265V. Before start-up power supply, please confirm the matching between the power supply and the working supply, and ensure that the power supply has been grounded, to prevent electric shock, the instrument shell has received a power outlet wire.
2. Please do not operate in an explosive environment, so as to avoid the explosion of personal injury.
3. Please do not turn on the instrument shell, the instrument has a high voltage power in some places, to prevent electric shock.
4. Do not allow the plug connection in the case of charged, so as to avoid electric shock.
5. If the instrument is damaged because of violation of safety rules, the company does not undertake any responsibility.

1.Summary

Three-phase electric parameter tester adopts high-speed CPU for data processing, voltage / current transformer adopts high precision sampling, to ensure the measurement stability and accuracy. With effective value (RMS) measurement, can accurately measure the single-phase and three-phase electrical parameters, the instrument has function, perfect performance advantages and simple operation. To meet the high speed measurement of production site, but also to meet the measurement requirements of laboratory and research.

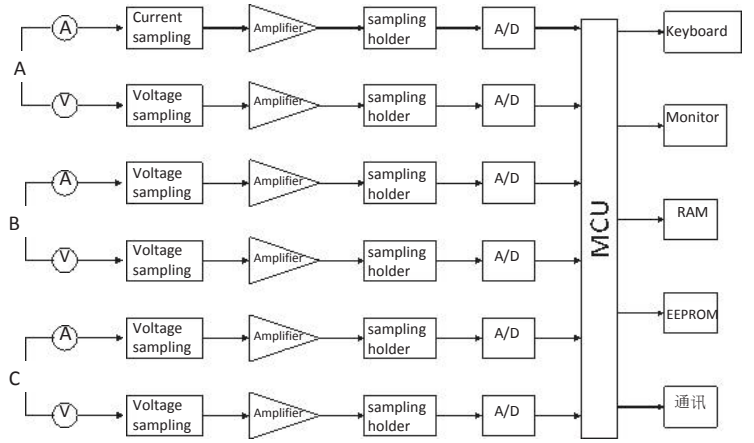
Widely used in lighting appliances, electric tools, household appliances, motor, electric appliances and other areas of production line, quality inspection departments and laboratories.

According to the actual needs of users can customize a variety of measurement functions, to meet the application of higher.

Intelligent three-phase electrical parameter measuring instrument has the following characteristics:

1, digital display, intuitive readings, using high-speed AD converter and 32 bit MCU operation.
2, measurement of electrical parameters for single-phase and three-phase three wire, three-phase four wire equipment.
3, multi window display at the same time, the voltage and current of single-phase, three-phase power and power factor measurement / frequency stability, fast measurement.
4, voltage and current automatic range switching, improve the measurement accuracy.
5, the measurement accuracy is not affected by the wave effect, high reliability, long service life.
6, the external current transformer to expand the scope of measurement, set the current rate, directly read the current value.
7, with RS-232 serial communication interface, to facilitate communication with the computer (the charge)
8, can freely set the alarm parameters, a sound and light alarm function, improve the efficiency of mass detection.

## 2. Measurement principle




The original basic block diagram

As shown in figure, the instrument is made up of analog and digital parts. The simulation part is composed of a sensor, a programmable amplifier, a sample holder, A/D Circuit. And the digital part comprises a microcomputer data memory, a keyboard and a display.

The Voltage signal to be measured is converted to a weak signal with the voltage sensor. And this weak signal would be amplified by the programmable amplifier controlled by the microcomputer, and handled by the sampling holder. At last, it is converted to digital signal by A/D Circuit, which can be used to calculate the voltage effective value (VRMS).

As the same with Voltage Signal, the current signal is handled by some circuit, and converted to digital signal at last. The microcomputer calculates the current effective value (IRMS) and exports it to monitor.

For time-sampled signals, RMS calculation involves squaring the signal, taking the average, and obtaining the square root.

$$U_{RMS}=\sqrt{\frac{1}{N}\sum_{i=1}^{N}Ui^{2}} \qquad I_{RMS}=\sqrt{\frac{1}{N}\sum_{i=1}^{N}(I_i)^{2}}$$

$$P=\frac{1}{N}\sum_{i=1}^{N}U_i+I_i \qquad PF=\frac{P}{U_{RMS}X\ I_{RMS}}$$

In the formula N to cycle sampling points (cycle depends on the frequency of the measured signal), numerical for a sampling time of Ui and Ii.

Three combined operations

3W3P

$$U(\sum)=\frac{U_{AB}+U_{BC}}{2} \qquad I(\sum)=I_A+I_C$$

$$P(\sum)=P_A+P_C \qquad PF(\sum)=\frac{P_A+P_C}{(U_{AB}+U_{BC})X(I_{AB}+I_{BC})}$$

3W4P

$$U(\sum)=\frac{U_A+U_B+U_C}{3} \qquad I(\sum)=I_A+I_B+I_C$$

$$P(\sum)=P_A+P_B+P_C \qquad PF(\sum)=\frac{P_A+P_B+P_C}{(U_A+U_B+U_C)X(I_A+I_B+I_C)}$$

EXPLAIN

In 3W3P measurement, combined with power and power factor measurement table method (P =PA+PC), (PA, Pb, PC separately) readings are meaningless.

A shall be connected to terminal position in single phase measurement. The three-phase supply in each phase of the phase difference between 120 degrees, frequency measurement of A phase can also phase with same frequency.



## 3.1 Specifications

Model description

| Model | Function | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1W2P | | | | 3W3P /3W4P | | | | | | Communication | Remarks |
| | Voltage | Current | Power | Factor | Voltage | Current | Power | Factor | Apparent power | Frequency | | |
| PZ9930 | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | □ | |

Remarks: ■Standard functions ,□optional features
The above functions can be customized according to user needs.。

2) Range and Accuracy

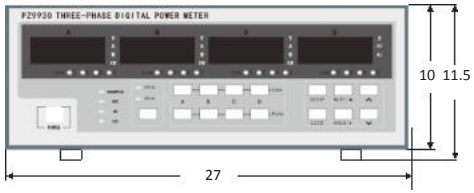
| Model | Measurement range | intrinsic error |
|---|---|---|
| AC Voltage | 3V～600V | ±(0.3%rdg+0.1%fs+2bit ) |
| AC Current | 0.01A ～40.00A | ±(0.3%rdg+0.1%fs+2bit ) |
| Power | 0.01W ～9999W ～9999KW | ±(0.3%rdg+0.1%fs+2bit ) |
| PF | 0.000 ～±1.000 | ±(0.004+0.001/bit ) |
| Frequency | 45～400Hz | ±(0.2Hz+0.1/bit ) |

## 3.Usual Technical Issues

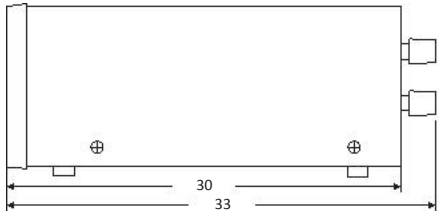
| | |
|---|---|
| Frequency range | D C/AC base 45-65Hz, Bandwidth 5kHz |
| Input impedance | Voltage greater than1MR,Current less than0.02R |
| Continuous maximum | Voltage650V ,current 48A |
| Instantaneous maximum input(1S) | 1000V,80A |
| Measurement update speed | ≈3 times per second |
| Preheating time | About 3 minutes |
| Operating environment | 5～40℃,20%～80%RH(No condensation ) |
| Insulation, withstand voltage | Insulation:>10MΩ,Pressure:AC2KV/1min |
| Operating voltage and power consumption | 220V±%10,50Hz/60Hz |
| weight | ≈4.0kg |
| Alarm function description | With voltage and current, power, power factor, set the alarm function. External expansion transformer ratio setting. |

## 4.Dimensions (CM)

Positive

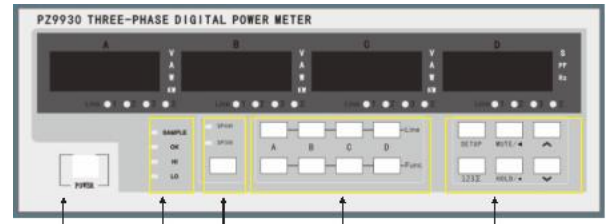



Side






## 5.Panel description




Power switch

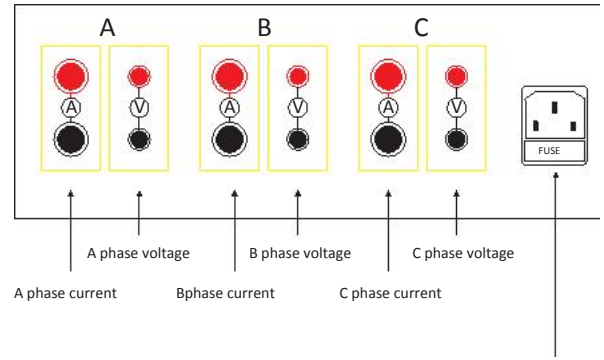
Samp Lamp
ok Lamp
upper out Lamp
lower out Lamp
(Limited intelligence )

3W3P
3W4P

ABCD four window line and the function of the switch

Keyboard
Set key
Mute, displacement
dataSet value increase
The parameters of fast switching phase
HOLD, decimal point displacement
Set numerical reduction

## Back function description




Working power AC86-265V accessNeed to ensure that the ground of the instrument is good

## 6.Display and operation instructions

Display function: the measurement parameters are displayed by the four display window,
A,B,C window by the corresponding line and function keys can be cut to display the three-phase phase or phase of the voltage, current, power electrical parameters, in the measurement of more than 120% of the full scale display "OL"D window by the corresponding line and function buttons can be switched to display the three phase phase or phase of the apparent power, frequency, power factor.

### 6.1 instructions

1.refresh light: when there is a measure of input, the lights flicker, when the measurement shows 0, the lamp is off,
2.Lamp: in the measurement of current and active power, such as the display value in the pre - set value of the upper and lower limits, the qualified lights lit.
3.ceiling lamp: when the measured current and active power, such as the display value is greater than the preset upper limit value, the ceiling lights flashing (and corresponding to the upper limit of the current or active power display value flicker), or put out.
4.floor lamp: when the measured current and active power, such as the display value is less than the preset limit value, the lower limit lights flashing (and corresponding to the upper limit of the current or active power display value flicker), otherwise put out.
5.lamp units: V \ a current \W power (Watts) power \K (thousand Watt) \S seen in power (thousand Watt) \Hz frequency \PF power factor
6.line lamp: 1 A, 2 B 3, said C, said the combination of sigma.



### 6.2 key note

Measurement selection key: used to switch three-phase three wire and three-phase four wire measurement
1.Line keys, respectively, with four key (A\B\C\D) corresponding to switch A, B, C, D four windows of the split phase and the combined phase electrical parameters.
Function keys, respectively, four buttons (A\B\C\D) corresponding to switching a, B, C, D four window of the measurement of electrical parameters, as shown on the ABC window of voltage, current, power (W, kW automatic switching), D window display apparent power, frequency, power factor
Set key: in the measurement, press this key can enter the alarm settings interface, the first to enter the upper limit voltage setting, current window last digit flashing, also cap lamp lights up. According to the displacement of the left arrow key to move the cursor, click add \ down key for setting the value, after setup is complete, press set button to sequentially a set voltage lower limit value -- current limit - power limit - power factor on limit - a current rate of exit. According to the "123∑" key halfway quick save and exit.
Mute / shift key: at the state of alarm beeps, press this button for silencing, press again to return to the audible alarm state, in settings, press this button to escape the cursor to the left ring displacement.
Add key: in the set state, the next key to the numerical increment.
123∑ key: in the measurement, press this key can be quickly separated and electrical parameters, followed by A -B phase -C phase - phase. In the A window display voltage, B phase display current, C window display power, D window display power factor,
The hold button.: in the measurement, press this button to lock "hold" the measured values, until pressed again before returning to state measurement. In settings for decimal point shift key
Reduce key: in the setting state, the next key to the numerical value.

## 7.menu operation

| First level menu | Second layers menu | explain |
|---|---|---|
| | | Measurement state press the "set" button to enter the voltage upper limit alarm value |
| ah-u | 0 → 8888 | Set voltage limit alarm value, Setting Range 0: .1- 600 0V. |
| al-u | 0 → 8888 | Set the alarm value of the lower voltage limit Setting Range 0: .1- 600 0V. |
| ah-I | 0 → 8888 | Set the alarm value of the current limit, Setting Range 0: .001 99- 99A |
| al-I | o → 8888 | Set the alarm value of the lower limit of the current Setting Range:0.001-99.99A |
| ah-p | p-hi 0 → p-hi 8888 | Set power limit alarm value Setting Range:0.001-9999W |
| al-p | 0 → 8888 | Set the alarm value of the lower limit of the power Setting Range:0.001-9999W |
| ah-f | 0.000 → 1.000 | Set PF upper limit alarm value Setting Range 0: .001 1.000 |
| al-f | 0.000 → 0.000 | Set the PF lower limit alarm value Setting Range:0.001-1.000 |
| ct | 0.0 → 0.0 | Set current ratio |
| 2200 | 2000 4400 1000 | exit |

exit



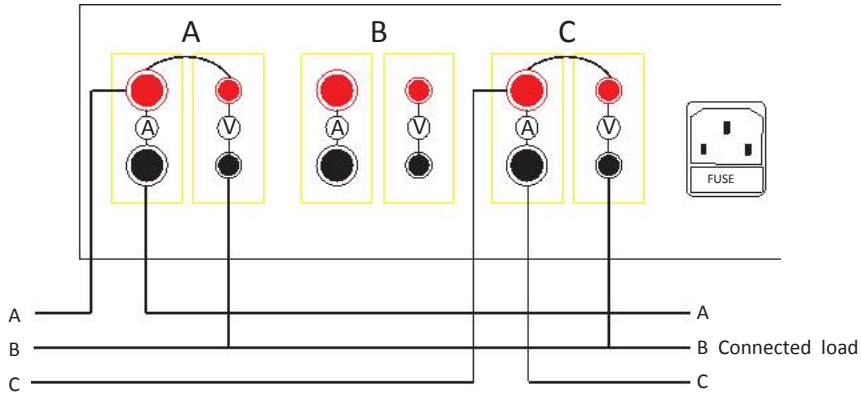
## 8.operation instructions

### 8.1、Measuring connection method

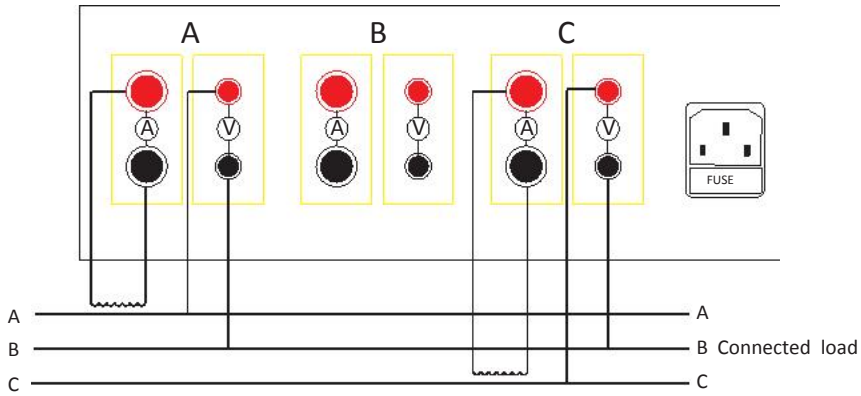
3W3Pwiring method

Connection as shown below, the two wattmeter method measuring connection and measurement can also be used, but are only road in the first and third road electrical parameters for the operation. Second road show no significance.

Direct measurement wiring diagram without transformer



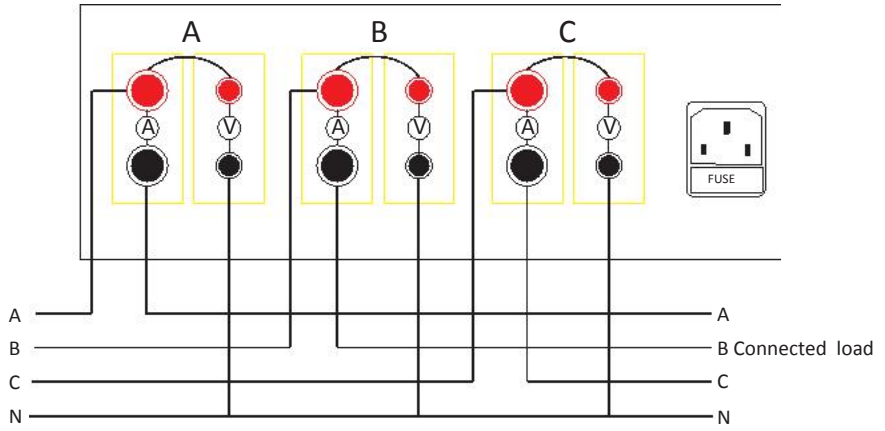

Large current transformer measurement wiring diagram



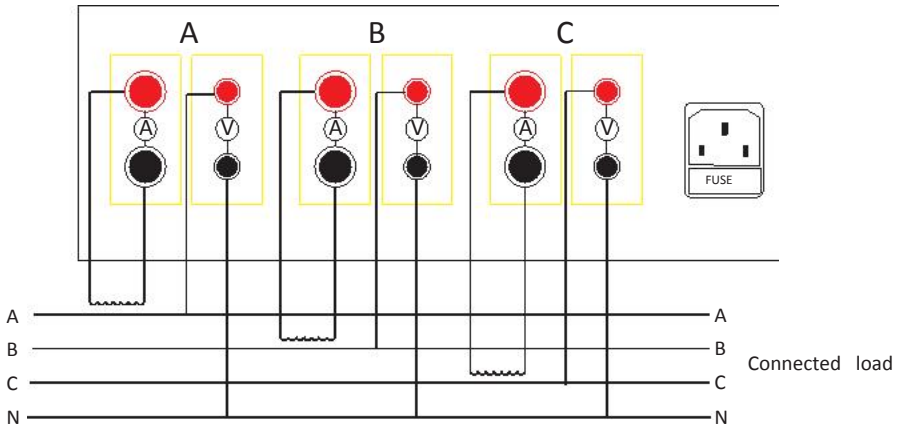
3W4Pwiring method

Wiring as shown below,

Direct measurement wiring diagram without transformer




Wiring Diagram of Large Current Transformer Measurement






According to the size of the load current by connecting wires large enough, so the wire resistance is too large, resulting in additional measurement error, and may make the wire, dangerous. Wire should be as short as possible,should be far away from the wire enclosure.

In the connection, should make a good contact between the wire and the connecting pole, contact surface as much as possible, and should be screwed immediately line column. Do not make the wire from the terminal or to make the wire contact with the back of the instrument, in order to avoid danger.

When the measured voltage or current has high frequency components, or the measurement of high current,the wiring should pay attention to may produce interference and noise, affect the accuracy of measurement.

## 2.Start up

First the power socket on the Rear panel of the instrument should be plugged on, and connected to ground wire necessarily.

After the wiring detecting, the instrument power switch can be pressed down, which is located in the front panel of the instrument. When the power of the load is turned on and works stably, the required measurement values can be read from the display of the instrument front panel.

Note: The instrument should be warm for 3 minutes before entering the stable state. After cutting off the power supply of the instrument, it is more than 10 seconds to wait for the power supply. It is forbidden to repeatedly switch power supply in a short time, which can cause the life of the instrument to be shortened, and it may cause the instrument malfunction. After the current measurement is finished, turn off the instrument power supply, and pull off the plug, in case of possible lightning damage to the instrument.

## 9.Sorting function

With regard to Inspection of finished product on the production line, it is needed to test a large number of finished products, in order to judge the quality of the batch. In order to improve the efficiency of the test, some limiting condition can be set up in the instrument to determine the qualified or not. This function is conducive to reduce the operation of the operator, and greatly improve the test efficiency. This is the sorting function of the instrument.

In order to get the correct result, the correct parameters of the instrument must be set up. See menu operation instructions in detail.

Qualified alarm:

The user can set the upper and lower limits for the voltage, current, power and power factor of the tested parts. In the sorting test, if the measurement value of the corresponding item is less than the upper limit, and greater than the lower limit of the set value, it is said to be qualified, then the buzzer sound, remind the operator.

Failure alarm:

If the test value of the corresponding item is greater than the set value, or less than the lower limit of the set value, said to be the test piece is not qualified, buzzer also issued a sound.

## 11.Calibration and correction

Before the operation of the calibration or correction, the connection between the 2 terminals of the instrument should be removed, and the accuracy of the standard meter should be higher than the product.

All instruments and equipments shall be supplied for at least 15 minutes before calibration or calibration. The voltage or current output of the standard AC source should adjusted slowly, and then the user can observe the standard meter reading. After the data is stable, the user can record the data of the standard equipment and meter examined, and calculate the value of the base, to determine whether the error range.

Verification condition

| Item | Reference value or range | Error range |
|---|---|---|
| Environment temperature ℃ | 20 | ±5 |
| Environment humidity % RH | 45～75 | |
| Atmospheric pressure KPa | 86～106 | |
| AC power supply voltage V | 220 | ±2% |
| AC power supply frequency Hz | 50 | ±1% |
| AC power supply waveform | Sine wave | ß=0.05 |
| External electromagnetic interference | Avoid | |
| Ventilation | Good | |
| Sunshine | Avoid direct sunlight | |

Packing list

| | |
|---|---|
| Equipment host | 1 |
| power line | 1 |
| Use manual | 1 |
| Certificate / warranty card | 1 |

Warranty

The instrument is guaranteed for 1 years since the purchase date. In the period of warranty, Because of the improper operation of the user , the equipment is damaged, the user should expense the maintenance costs.

The user shall not open the instrument case without the written consent of the company. Otherwise it will affect the instrument's warranty. Equipment maintenance should be authorized by the professional technical personnel of the company. And any change of the internal components about the instrument is forbidden. It is needed to re-measure the calibration after instrument maintenance, so as not to affect the accuracy of the test.

Such as the user's blind maintenance, replacement of the instrument components and cause damage to the instrument, does not belong to the scope of the warranty, the user should bear the cost of maintenance.

The company has the power to improve the specification and the appearance and function of the instrument, without further notice.

Sales service please
contact the local dealer