Huazheng®

HZ-ZKD
Vacuum switch vacuum tester

User Manual

Huazheng Electric Manufacturing (Baoding) Co., Ltd

Dear user:

Thank you for choosing HZ-ZKD Vacuum switch vacuum tester.

We hope that this instrument can make your work easier and more enjoyable, so that you can get the feeling of office automation in the test and analysis work.

Before using the instrument, please read this manual, and operate and maintain the instrument according to the manual to prolong its service life. "Just a light press, the test will be completed automatically" is the operating characteristics of this instrument.

If you are satisfied with this instrument, please tell your colleagues; if you are not satisfied with this instrument, please call (0312) 6775656 to tell you to serve you at all times-Baoding Huazheng Electric Manufacturing Co., Ltd., our company will definitely make you satisfied !

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I、Safety rules and precautions

1. Please connect all test cables before starting up, such as printer cables;

2. Before measuring, please check whether the tube type is suitable for the vacuum tube to be tested for accurate measurement.

3. When starting up, shutting down and measuring, do not touch the high voltage line and magnetron current line to prevent electric shock.

4. During the use of the instrument, if abnormal noise is found from the coil, the short circuit or poor contact of the test line should be considered, or the air is very humid, or the surface of the vacuum circuit breaker is covered with dust.

5. Please do not use gasoline, banana water and other chemical agents to wipe the machine, but a soft and dry cloth.

6. Please confirm whether the local power grid voltage matches the power supply voltage of the machine.

AC 220±10% 50/60HZ

7. Please be careful not to use the machine under thunderstorm conditions.

8. Please do not damage the cables that come with the machine to ensure safe use.

9. When the instrument fails, non-professional and technical personnel of the company are strictly prohibited from opening the instrument for maintenance.

10. It is strictly forbidden to disconnect the high voltage end directly or indirectly to the ground.

II、Instrument introduction

The vacuum tester is an appraisal device for the vacuum of the vacuum interrupter. It uses a single-chip computer as the main control unit, and the testing process is fully automated. In principle, this instrument has changed the method of calibration for similar products at home and abroad by current peak value, and uses ion charge for calibration. In this way, the accuracy of the physical principle is higher, and the interference of the pulse power

supply during the test is effectively suppressed, and the test is stable and reliable. The instrument uses the secondary sampling method to deduct the leakage current due to environmental factors, and considers the determination of the completely leaking vacuum interrupter during the measurement process, and truly achieves the correctness of the vacuum interrupter installed on the whole machine. Accurate measurement. At present, there are 35 measurement standard curves of vacuum interrupter in this instrument, covering most tube types at home and abroad. The instrument has excellent quality, reliable performance, beautiful appearance and convenient use.

Performance characteristics：

1. Sampling technology based on ionizing charge

All vacuum testers use sampling technology based on ionized charges. Our company's experts discovered in the study of magnetron discharge: when the external excitation power supply, the geometric size of the vacuum interrupter, and the materials used are certain, the vacuum degree in the vacuum interrupter has a very accurate correspondence with the amount of ionized charge. The peak value of ionization current is only indirectly related to probability. Therefore, our company pioneered the sampling technology based on ionization charge, which significantly improved the accuracy of vacuum measurement in the vacuum interrupter.

2. High and low pressure tube type test

This machine additionally applies two gears (high voltage 30,000 and low voltage 2.5) to the test voltage output, so it can effectively test various types of tubes with different high and low voltages.

3. Built-in measurement curves of almost all vacuum interrupters at home and abroad

Due to the different geometrical dimensions and materials of the vacuum interrupter, when the internal vacuum degree and the external excitation power supply are constant, the amount of discharge charge is different, and there are considerable differences. For accurate measurement, there must be a corresponding deduction curve from ionization charge to vacuum degree for each vacuum interrupter. Through close cooperation with major domestic vacuum interrupter manufacturers, our company's experts have obtained

data on the relationship between ionization charge and vacuum degree of almost all vacuum interrupters at home and abroad, and send their characteristic parameters to this series through mathematical processing. product. Therefore, this series of products have built-in measurement curves of almost all vacuum interrupters at home and abroad, which is unique among similar products at home and abroad.

4. Treatment of leakage current

When a negative ion current is applied to the moving contact of the vacuum interrupter in the breaking state, the static contact end will have a leakage current of several microamps, even if it is the same type of vacuum. The interrupter also has large individual differences. Especially for the vacuum interrupter installed on the complete machine, because of the leakage of the surrounding insulating supports, the sum of these leakages has greater instability and unpredictability. And the value is equivalent to the ionization current of the vacuum interrupter of the order of 10E-4Pa. We adopt the method of secondary starting high voltage, deducting the leakage current, and guarantee the vacuum measurement accuracy of the vacuum interrupter whether installed on the whole machine or to be installed.

5. Identify the completely leaking vacuum interrupter

In this machine, it is judged whether the vacuum interrupter is completely leaking by means of high pressure breakdown.

6. Complete input protection circuit

When the vacuum degree of the vacuum interrupter is very low, the vacuum interrupter will be broken down by high voltage during the measurement, and the instant high voltage is directly applied to the negative ion current sampling circuit, making it bear a very strong electrical shock. The sampling circuit adds a complete protection circuit. Even if the instrument is the first time because the high voltage at the input terminal is directly applied to the negative ion current sampling terminal, the microcomputer protection device will immediately start to control and enter the protection state without causing serious damage to the circuit.

7. Data recording

Built-in micro-printer can print out the measured data at any time.

III、Test principle

Using the different leakage currents of the ion current under different vacuum conditions to test and identify the advantages and disadvantages of the vacuum isolation chamber. The two contacts of the arc extinguishing chamber are separated by a certain distance, and the moving contact applies a high voltage pulse to the static contact to apply a negative ion current. Because the leakage current is very weak, it is susceptible to different interference from the outside world to reduce accuracy. Therefore, the excitation coil must be wound outside the arc extinguishing chamber, and a large current is passed to the coil to generate a pulsed magnetic field synchronized with the high voltage in the arc extinguishing chamber to accelerate the ion current and enlarge the sampling rate proportionally. In this way, under the action of the pulsed magnetic field, the electrons in the arc extinguishing chamber move in a spiral motion and collide with residual gas molecules to ionize. The ion current generated is approximately proportional to the residual gas density, that is, the degree of vacuum. For vacuum tubes with different diameters, under the same vacuum conditions, the magnitude of the ion current is also different. Through experiments, the corresponding relationship curves of vacuum degree and ion current of various tube types can be calibrated. When the ion current is measured, the corresponding internal proportional parameters are called and accurately calculated to obtain an accurate and true vacuum value. That is to say, the vacuum degree of the tube is obtained by querying the ion current-vacuum curve of the tube, and this process is automatically completed by the computer.

IV、The main technical parameters

1. Measured vacuum bubble: voltage level above 6KV-35KV

2. Measuring range: 10^{-5}-10^{-1}Pa

3. Measurement error: ±10% in 10^{-4}-10^{-1}Pa

4. Measurement resolution: 10^{-5} Pa

5. The leaking arc extinguishing chamber will undergo electrical breakdown during the measurement, and the machine is in a protected state.

6. Allowable ambient temperature: -20℃-50℃, if the test is below 0℃, please power on

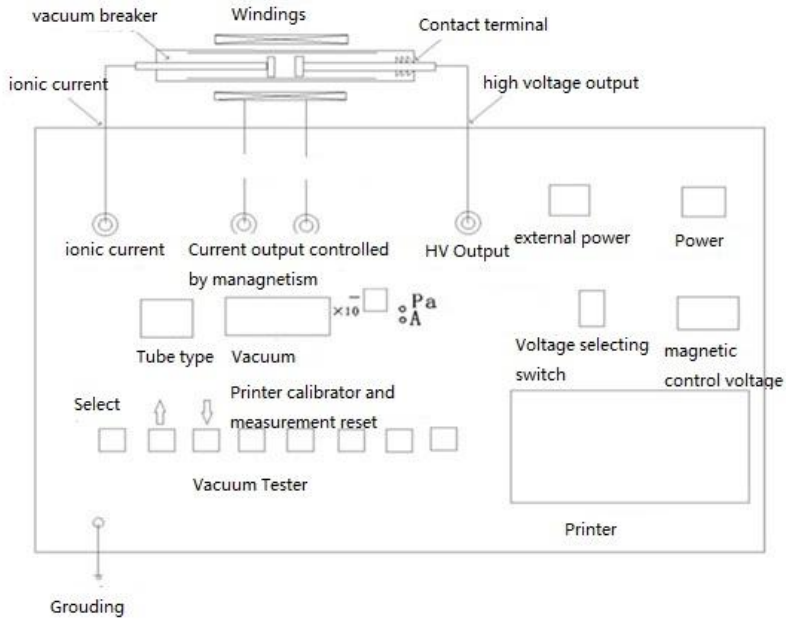
the machine for 20 minutes before using it.

7. Air humidity: <85%RH

8. Input power: AC220V±10% 50/60HZ

9. Dimensions: 350mm×320mm×225mm

V、Vacuum tester panel and external wiring diagram



Panel introduction:

1. Ion current output terminal: used to output the ion current required for testing. (Leakage current sampling terminal)

2. Magnetron current output terminal: used to output the magnetron current required for the test to accelerate the electron flow to reduce the influence of various external factors on the measurement accuracy.

3. High voltage output terminal: used to output the high voltage required for testing. (Low voltage 25,000 volts, high voltage 30,000 volts) For details, see 3.3.5 operating instructions.

4. External power supply: Provide the working voltage required by the instrument. AC220V±10% 50/60HZ

5. Power switch: the main switch to control the instrument.

6. Tube type: used to select the tube type corresponding to the test.

7. Vacuum degree display: used to display the true value of the detected vacuum degree. (The reading is taken by scientific notation)

8. Pa (vacuum) light: used to indicate the current reading type and unit

9. A (current) light: used to indicate the current reading type and unit. For details, see 3.3.4 Operating Instructions.

10. High-voltage selector switch: used to select the high-voltage level required for measurement. The tube type to be tested is the high-end selected above 10KV. Choose low gear below 10KV.

11. Magnetron voltage: used to indicate the voltage of the magnetron coil.

12. Key: the selection key is used to select the tube type, and the light of the selection key is on to be effective; after the tube type is selected, the light of the selection key is off to be selected.

Up and down keys: used to scroll up and down to select the desired tube type.

Print key: After the measurement is over, print out the measured data. The print button light is on and effective.

Check key: If there is no alternative parameter, you can use the check key. This can directly produce ionization current. Generally speaking, the ionization current (A) is about two orders of magnitude smaller than the vacuum degree (Pa).

Measurement key: After the tube type is selected, the measurement key light is on to indicate the start of measurement.

Reset button: used to reset the whole machine after measurement. Press【Reset key】, the instrument returns to the initial state. If selected during measurement

If the selection is wrong, you can press [Reset Key] at any time to re-select.

13. Printer: used to print test data. The S/L key is the paper feed and eject key; the POW is the power indicator. After the printing paper is used up, press the buckles on both sides of the upper cover, open the upper cover, take out the paper roll, and load new paper.

14. Connect to the earth: used to connect with the earth to reduce the influence of static electricity.

VI、Instructions

1.Wiring instructions

Keep the two contacts of the isolation room in a separate state, then wind the magnetron coil, and then insert the two plugs of the magnetron coil into the two red and black plugs of the magnetron current output. In addition, the high-voltage wire and the ion wire are respectively connected to the two contacts of the vacuum bubble (moving and contacts are not separated).

2.Button description

All the keys on the panel, if the small indicator light on them is on, it means the keys are valid, otherwise, they are invalid. If the key is valid, press the key again, the indicator light is off, and the key is in an invalid state.

3.Test procedure method

(1) Boot

After checking that the wiring is correct, it can be turned on. Press the power switch key on the panel of the instrument to the “on” position, and the word “P” appears in the first digit of the digital display. After verification (step 3.2) is normal, the instrument is operating normally, and it can be started after 5 minutes of warm-up. measuring.

(2) Instrument inspection

Perform this function to calibrate the instrument and self-check function. Press [Select key], [Check key], [Measuring key] in sequence to make it valid. Use the up and down keys to adjust the inspection parameters (tube type display)

①Select parameter 1～3 to check the sampling amplifier：

When adjusted to 1, the displayed value is between 0.000---9.000×10^{-6}；

When adjusted to 2, the displayed value is between 0.000---9.000×10^{-5}；

When it is adjusted to 3, the displayed value is between 0.000---9.000×10^{-4}；

②Select parameter 4, charge control check:

When it is adjusted to 4, the charging circuit is turned on, and finally the capacitor voltage is controlled at 350V.

③Select parameter 5 and check the display:

At this time, the display lights up one by one, and the six digits are consistent, not many

strokes and fewer strokes. After checking, press 【Reset key】.

Select parameter 6, start high voltage:

At this time, the high voltage indicator light is on, high voltage is generated, and the last four digits of the display show the high voltage value in ten thousand volts. When doing this inspection, pay attention to the location of the high-voltage line to avoid danger.

④Select parameter 7, internal data storage check:

The computer in the instrument performs a strict inspection on the internal data memory, and the display shows the address of the unit being inspected. If an error occurs, the computer stops the inspection, and the value of the display is the error address. The unit number is 8000H-9FFFH. When it is close to 9FFFH, press the up and down keys to exit the check when the check is over, otherwise, repeat the check.

（3）Tube type selection

①When measuring, first confirm the vacuum bubble tube type. Refer to Appendix 1 or Appendix 2 in the manual. Enter the curve number corresponding to the vacuum bubble tube type into the tube type of the instrument display window.

②If the tube type to be measured is not indicated in the manual, the diameter (outer diameter) of the vacuum bubble can be measured on site and the corresponding curve number can be found. It should be noted that the dimensions are as close as possible when measuring, and the wiring method is the same.

③Enable [Select key], and then use ↑ key ↓ key to adjust the tube type parameters and call up the required curve number (see Chapter 2 Instrument Introduction/Performance Features/Section 3 for details)

④ If there are no alternative parameters, the [calibration key] can be enabled, so that the ionization current can be directly given. Generally speaking, the ionization current (A) is about two orders of magnitude smaller than the vacuum (Pa).

⑤The tube type under test is to select the high position of the selector switch above 10KV, and the low position of the selector switch below 10KV.（4）Test

①After the tube type is determined, press the [select key] to exit the selection, and press the [measurement key]. The instrument then automatically completes all measurement, calculation, display and other whole processes. If the print key is pressed at this time,

the measurement result will be printed.

②The measurement steps performed by the computer in the instrument are as follows: Start the high voltage → measure the leakage current → turn off the high voltage → turn on the charging switch → the voltage reaches the specified value → start the magnetron current, measure the leakage current + ionization current, → deduct the leakage current → convert the current into a vacuum value → display. If the [calibration key] is valid, the current value will be displayed.

4.About test results

(1) After the test shows that the current value is zero, you should check whether the surface of the arc extinguishing chamber is clean, because the surface is dirty, which may cause the leakage current to change value greater than the ionization current value. In this way, the measured value after subtracting the leakage current is less than zero and the instrument judges If this happens, wipe the surface of the arc extinguishing chamber and do the test again. Generally speaking, the vacuum degree obtained in this way is higher.

(2) Based on the first measured value, the vacuum degree obtained by continuous multiple measurements will gradually increase, which is higher than the actual vacuum value of the interrupter. If multiple measurements must be taken, the time interval between each measurement is about one week.

VII、Packaging list

No.	Name	Qty
1	Magnetron current output line	1
2	Negative ion wire	1
3	Ground wire	1
4	Fixed strap	1
5	printer paper	2
6	power cable	1