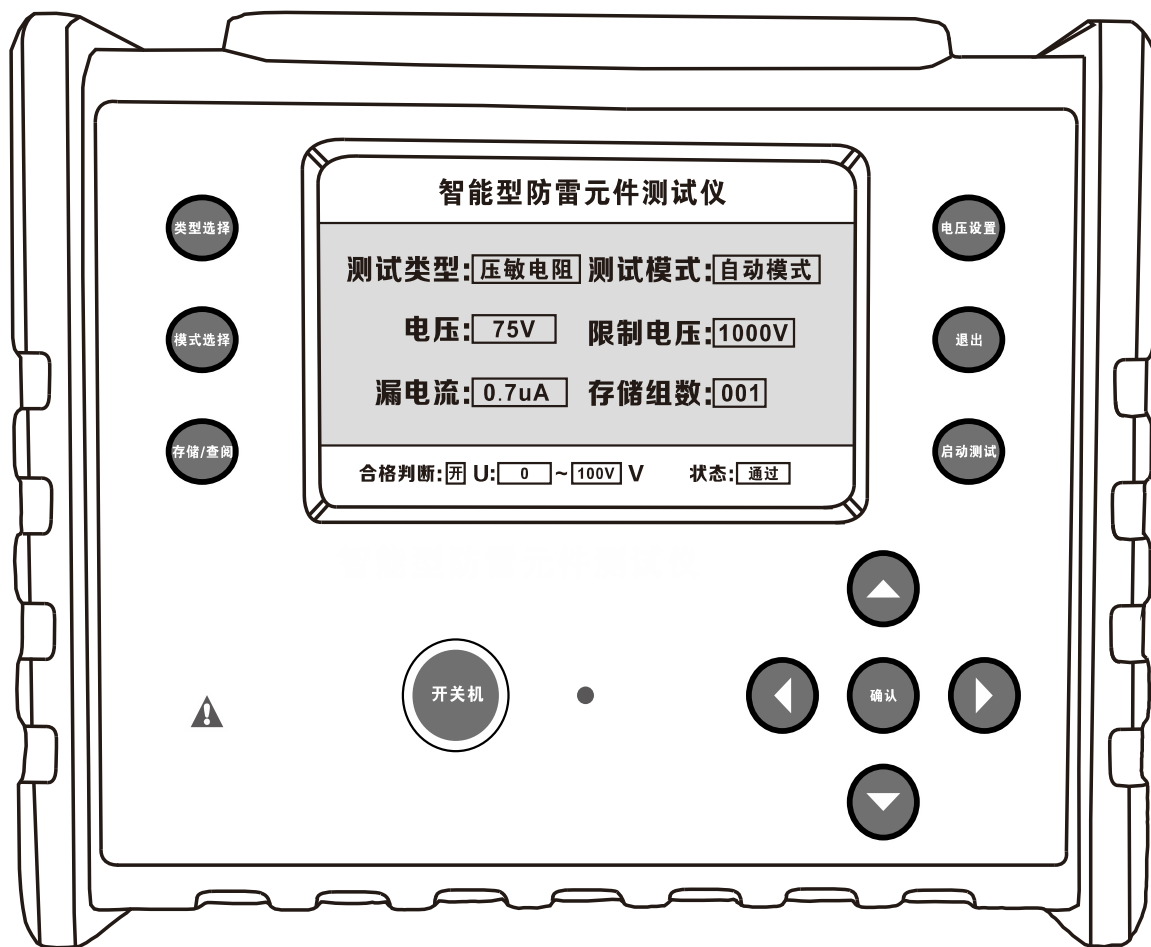


# SPD Field Tester



## ES9020 USER MANUAL

Guangzhou Zhengneng Electronic Technology Co.,Ltd



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# I. Safety Precautions and Procedures

Thank you for purchasing our company's **Intelligent Lightning Protection Component Tester**. Before using the instrument for the first time, in order to avoid possible electric shock or personal injury, please be sure to **read and strictly observe the safety rules and precautions listed in this manual**.

In any case, the use of this instrument should pay special attention to safety.

- 2 The instrument is designed, produced and inspected according to IEC61010 safety specifications.
- 2 In any case, the use of this instrument should pay special attention to safety.
- 2 When measuring, high-frequency signal generators such as mobile phones should not be used next to the meter to avoid errors.
- 2 Pay attention to the text and symbols on the body of the instrument.
- 2 Before use, make sure that the instrument and accessories are in good condition. The insulation layer of the instrument and test wire is not damaged, exposed or broken.
- 2 During the measurement, it is forbidden to touch exposed conductors and the circuit being measured.
- 2 Make sure the connection plug of the wire is tightly inserted in the meter connector.
- 2 Do not measure in flammable places, sparks may cause explosion.
- 2 When the instrument is in use and the enclosure or test wire is broken and the metal is exposed, please stop using it.
- 2 Do not place and store the instrument for a long period of time under conditions of high temperature, humidity, condensation, and direct sunlight.
- 2 When charging the battery, make sure the test line has been removed from the meter and the meter is off.
- 2 The meter displays the battery voltage low symbol “” and should be charged in time, otherwise it will cause an error.
- 2 Do not measure when the battery cover is open and when thundering
- 2 Pay attention to the measuring range and use environment specified by this instrument.
- 2 The use, disassembly, calibration and maintenance of this instrument must be performed by authorized personnel.
- 2 Because of the reason of this instrument, if it is dangerous to continue using it, it should be immediately stopped and sealed immediately, and it should be handled by a qualified organization.
- 2 The "" safety warning sign in the instrument and manual must be operated strictly in accordance with the contents of this manual.
- 2 The meter outputs high voltage, please be sure to connect the test line, and then press the test button to test after the hand leaving the test line. Otherwise there is a risk of electric shock

## II. Introduction

**Intelligent lightning protection component tester**, also known as **lightning protection component tester, SPD field tester**. It's a Special instrument for performance

testing of lightning arresters, lightning arresters, surge protectors, varistors, cermet discharge tubes, and direct-air lightning arresters. The instrument adopts the charging function and is used offline to overcome the shortcomings of the traditional product to be plugged in and used inconvenient on-site operation, the voltage output 2000V application range is more extensive, the use of high voltage short circuit protection, automatic discharge function, the instrument is reliable, safe and durable. At the same time, it adopts luxurious large-color screen display, data storage, data review, qualified judgment, automatic shutdown, USB data upload and other functions. The machine is beautiful and high-grade, wide in range, high in resolution, convenient in operation, convenient to carry, accurate, reliable, stable in performance and strong in anti-interference ability.

Moreover, it has anti-vibration, dust-proof and moisture-proof structure and adapts to the harsh working environment. It is an indispensable instrument for meteorological lightning protection, electric power, post and telecommunications, communication, electromechanical installation and maintenance, and industrial enterprises that use electricity as industrial power or energy. It is suitable for measuring performance parameters of various arresters and surge protectors.

The intelligent lightning protection component tester consists of medium and large scale integrated circuits. The output power of this instrument is large, the initial operating voltage measurement range is 10-2000V, the leakage current measurement range is 0.1~199.9uA, the repeatability is good, and the one-button measurement is convenient and quick.

### III. Rang and Accuracy

Measurement function	Output voltage	Measurement range	Accuracy	Resolution
Varistor	Starting action	10~2000V	$\pm 2\%rdg \pm 3dgt$	1V

	voltage <b>U1mA</b>			
	Leakage current <b>I0.75,1mA</b>	0.1~199.9uA	±2%rdg±10dgt	0.1uA
<b>Discharge tube</b>	Discharge voltage	15~2000V	±2%rdg±3dgt	1V
<b>Insulation resistance</b>	500V	0~1000M	±3%rdg±10dgt	1M

Base test condition: 1mA±10uA(23°C)

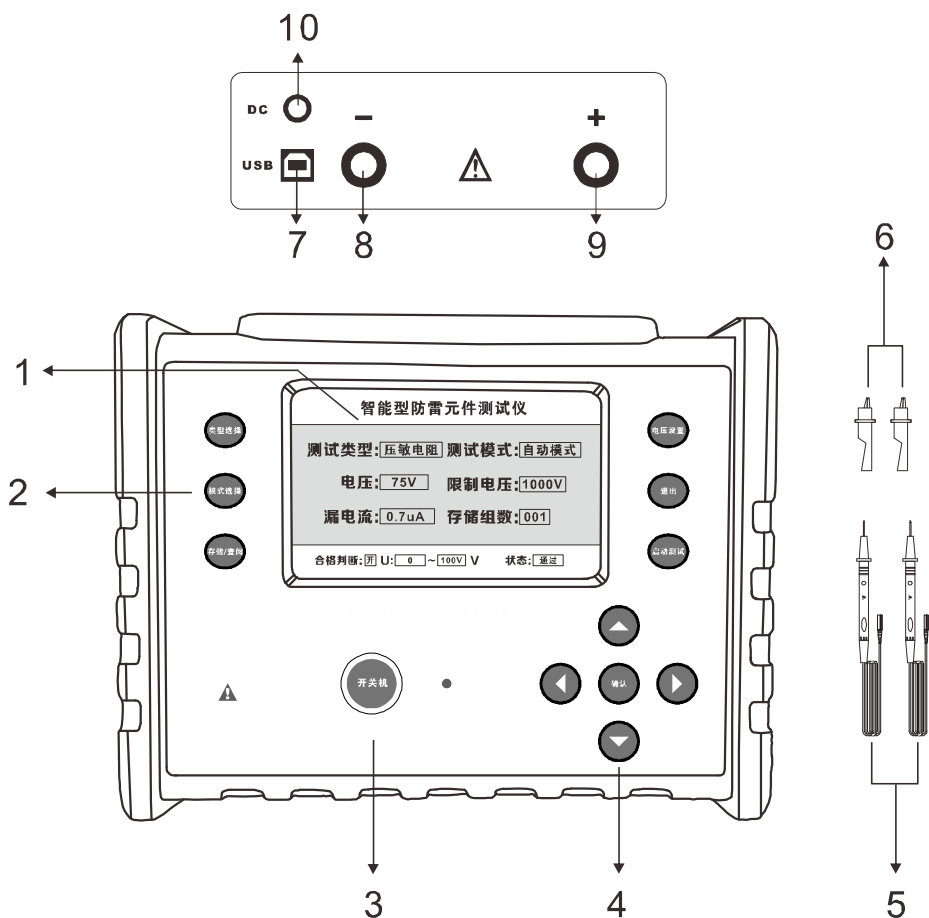
## IV .Technical Specifications

<b>Function</b>	Varistor, discharge tube discharge voltage and leakage current measurement, insulation resistance test
<b>Ambient temperature and humidity</b>	23°C±5°C, below 75%rh
<b>Power</b>	7.2V Large capacity rechargeable battery
<b>Measure method</b>	DC voltage drop method
<b>Shift</b>	Automatic shifting
<b>Backlight</b>	Have
<b>Display mode</b>	Color screen
<b>Measurement indication</b>	Text prompt in the lower right corner of the measurement (automatic mode only)
<b>LCD size</b>	108mm×65mm
<b>Instrument size</b>	L/W/H: 240mm×188mm×85mm
<b>Test line</b>	Red 1 meter, black 1 meter , each 1PC
<b>Overvoltage protection</b>	Have

<b>Data storage</b>	500 groups, "H" storage indication, "storage array" display "500" indicates that the storage is full
<b>Data review</b>	"MR" symbol indication when viewing data
<b>Overflow display</b>	"OL" symbol indication when overrange overflow
<b>Qualification judgment function</b>	The measured value has an audible indication within the range of the judgment value, and one sounds is qualified , and the unqualified sounds three times.
<b>Battery voltage</b>	The low battery voltage symbol indicates that the battery is promptly replaced when the battery voltage is low.
<b>Automatic shut-down</b>	The splash screen indicates that it will automatically shut down after 15 minutes of booting.
<b>Power consumption</b>	Standby: about 140mA(Lowest brightness)
	Maximum brightness: about 300mA
	Measure: about 830mA(Lowest brightness)
<b>Weight</b>	Instrument: 1230g (including battery)
<b>Working temperature and humidity</b>	-10°C~40°C; below 80%rh
<b>Storage temperature and humidity</b>	-20°C~60°C; below 70%rh
<b>Insulation resistance</b>	More than 200MΩ(between the circuit and the housing 500V)

<b>Pressure resistance</b>	AC 3000V/rms(between the circuit and the housing)
<b>Electromagnetic properties</b>	IEC61326(EMC)
<b>Suitable for safety regulations</b>	IEC61010-1(CAT III 300V、CAT IV 150V、pollution level 2);

## V. Structure



1. LCD

2. Function button

3. Power on/off button

4.Direction and confirmation button

5.Instrument pen

6.Safety alligator clip

7. **USB** interface

8. Public interface

9. Positive interface


10. **Charging** interface

## VI.Operation Method

### 1. Power On/Off

Press the "Power On/Off" button in the power-off state to turn it on. Press the "Power On/Off" button in the power-on state to turn it off.





### 2. Battery Voltage Check

After the power is turned on, if the LCD displays the battery voltage low symbol “”, it indicates that the battery is low, please replace the battery in time. The battery power is sufficient to ensure the accuracy of the measurement.

### 3. Varistor Test

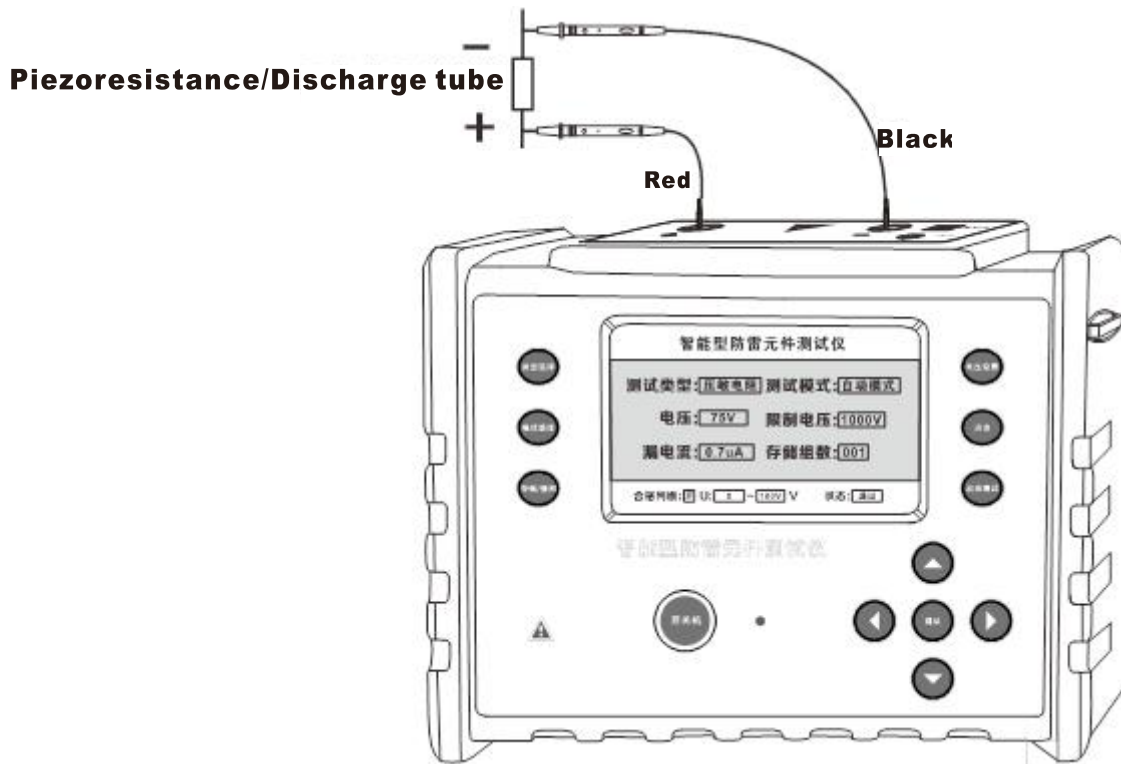
When measuring, press the “Type Select” button to select “varistor” and clamp the varistor under test (as shown below). There are two modes to choose from under the “varistor” type, namely “automatic mode” and “manual mode”, which can be selected by pressing the “mode selection” button.

Under the "automatic mode" test, you only need to press the "start test" button to start the test. During the test, the word "in progress..." will be displayed in the lower right corner. When the test is completed, the message "Test completed!" is displayed. . If you want to interrupt the test process during the test, you can press the "Exit" button to interrupt the test.

Under the “Manual Mode” test, press the “Voltage Setting” button and press the “” or “” button on the direction button to adjust the value of “Limit Voltage” to be more than 1.2 times the nominal value of the measured varistor. Press the (“” , “”)

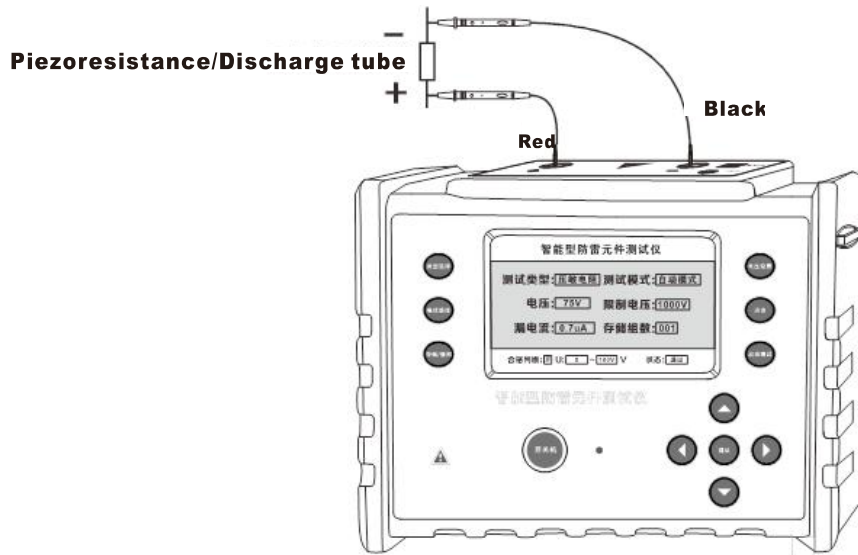


button to add or subtract 1 for short press, plus or minus 50 for long press, then press the "OK" button, then press the "Start Test" button to start the test. The voltage value when the current shows about 1 mA (1000 uA) is the  $U_{1mA}$  value (breakdown voltage), at this point, you can press the "Start Test" button again to check the leakage current value of the varistor under test. If you want to end the test, you can press the "Exit" button or press the "Start Test" button when checking the varistor leakage current value.



#### 4. Discharge Tube Test

When measuring, press the "Type Select" button to select the test type as "Discharge Tube" and clamp the measured discharge tube (as shown). Press the "Start Test" button to start the test. At this point, you can see that the voltage value is rising. When the voltage value stops, the test is completed. At this time, the voltage is the ignition voltage of the tested discharge tube (DC breakdown voltage).



## 5. Insulation Resistance Test

When measuring, press the “Type Select” button to select the test type as “Insulation Resistance”, and clamp the measured insulation resistance like clamp the varistor as described above. Press the “Start Test” button to start the test. In the lower right corner of the screen, there is a “in progress...” message. The test will stop automatically after about 15 seconds from the start of the test. If you want to interrupt the test in advance, you can press the “Exit” button directly.

## 6. Backlight Control

After booting up, press and hold the “Exit” button to enter the backlight brightness adjustment page. Press the “◀” and “▶” arrow keys to adjust the backlight brightness.

## 7. Qualification Judgment Setting


After booting up, press the “OK” button to enter the qualification judgment mode. At this time, you can see that the bottom text box on the screen is flashing, indicating that the item can be set. Press the “▲” or “▼” (short press plus or minus 1 when the upper and lower limits are adjusted, long press plus or minus 50) to adjust the parameters, press the “◀” or “▶” key to change the cursor position. When the qualification judgment state is adjusted to the “on” state, the qualification judgment can be turned on, otherwise the qualification judgment is turned off. The right side of “U:” is the judgment voltage range, the value in the left box is the lower limit of the judgment, and the right is the upper limit value. When the test is completed, if the measured voltage is within this range, it means qualified. “Pass” will be displayed in the “Status” box and the buzzer will sound once, otherwise, “Fail” is displayed and the buzzer sounds three times. As shown below:




## 8. Data Storage


After the power is turned on, the measurement is completed. Short press the “Store/View” button to save the data once. When saving, the “H” will be displayed in the upper right corner of the screen. After the save is completed, the “H” will disappear and complete a data save operation. Up to 500 sets of data can be saved, and the number of data sets that have been saved is displayed in the box to the right of the “Store Data” on the test interface.

## 9. Data Review/Delect

When the data is stored, press and hold the “Store/View” button to view the saved data. After the “MR” is displayed in the upper right corner of the screen, press “

In the data review state, long press the “storage/view” button to jump to the delete data page. Press “

## VII. Battery Description

The meter is powered by a 9V 6-cell LR14 dry battery. When the battery power is reduced, when the voltage drops to about 6.5V, the battery symbol “

## VIII. Accessories

<b>Instrument</b>	1PC
<b>Test line</b>	2PC (red, black each 1PC)
<b>CD</b>	1PC
<b>Charger</b>	1PC
<b>Battery</b>	7.2V large capacity rechargeable battery

<b>USB data line</b>	1PC
<b>Manual、 Certificate</b>	1SET
<b>Instrument box</b>	1PC



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