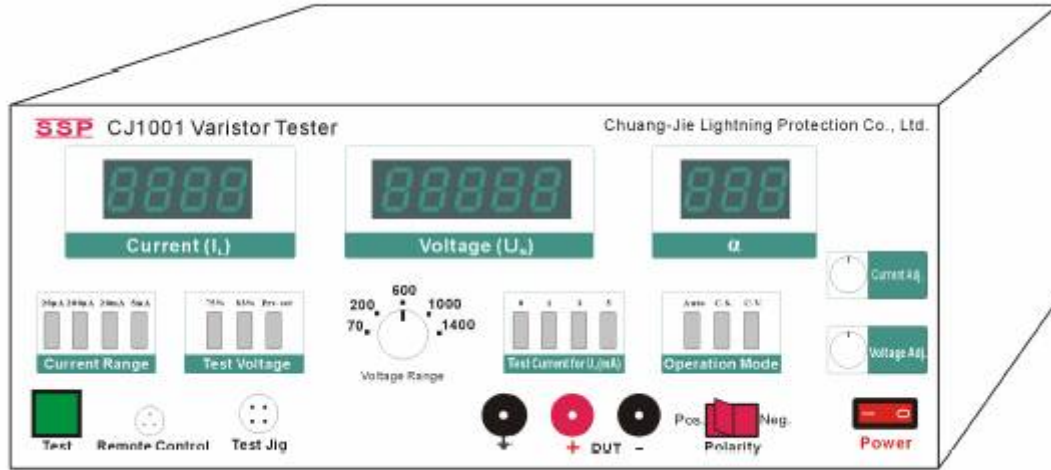


SSPCJ1001 MULTI FUNCTION VARISTOR TESTER SPECIFICATION



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1 Varistor DC parameters

Varistor is a kind of resistor which has a variable resistance with the change of current flow through it or voltage applied to it. Under a low current/voltage

condition, varistor's resistance is extremely high, which may act as an open circuit. When the current/voltage reaches a specific value, its resistance will drop dramatically with increase of current/voltage which may drop to a few tens of milli-ohms and act as a perfect conductor.

Therefore the varistor has an extremely broad range of operating current from μA to tens of KA, usually the characteristics of the varistor are verified by d.c. measurement when the operating current smaller than 10mA, while for greater operating current ranges, a pulse measurement will be performed.

The D.C. characteristics of the varistor usually cover three parameters:

- (i) Varistor voltage (UN)
- (ii) Leakage current (IL)
- (iii) Non-linearity index (α)

1.1 Varistor voltage (UN)

The voltage of varistor when 1mA current pass through it is named Nominal Varistor Voltage UN", which characters a change point of the state of varistor from insulating to conducting. UN is one of the important parameters of varistor.

1.2 Leakage current (IL)

The current pass through varistor when a specified voltage less than UN applied on it is named "Leakage Current" IL.

1.3 Non-linearity index (α)

Non-linearity index (α) is defined by the formula:

$$\alpha = 1 / (\log U_1 / \log U_{0.1})$$

where: U_1 , $U_{0.1}$ is the voltage across varistor when a specified test current I_L , and $(0.1I_L)$ passing through it respectively.

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2 CJ1001 Overview

CJ1001 is designed to test for the parameter of voltage-clamping component such as MOV and TVS. It can test for the nominal voltage (UN), non-linear index (α) and the leakage current (IL). CJ1001 is a multifunctional laboratory-type instrument which can also serve as a Constant Current (C.C.) and Constant Voltage (C.V.) source. There are three selectable operation mode “AUTO”, “CC”, “CV”.

2.1 “Auto” Testing Mode

2.1.1 Through a test period around 300ms, you can get three parameters readings

of the varistors under testing:

- i. Varistor voltage UN
- ii. Leakage current IL
- iii. Non-linearity index α

2.1.2 UN is determined at three selectable test currents IN (0.1mA, 1mA, 3mA).

2.1.3 α is determined by one of the three formula as below:

$$\alpha_1 = 1 / \log(U_{1000} / U_{100})$$

$$\alpha_2 = 1 / \log(U_{100} / U_{10})$$

$$\alpha_3 = 2 / \log(U_{1000} / U_{10})$$

where U1000, U100, U10 are the varistor voltage determined at 1000 μ A, 100 μ A, 10 μ A, respectively. The calculation is accomplished by a built-in single-chip computer.

2.1.4 IL is determined at three selectable test voltages—0.75UN, 0.83UN, or a preset voltage.

2.2 “C.C.” Constant Current Mode

At C.C. mode, when the “Test” button pressed, a current output to the DUT connector can be set optionally ranging from 5 μ A to 5mA and then get the responding voltage reading of the DUT.

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2.3 “C.V.” Constant Voltage mode

At C.V. mode, when the “Test” button pressed, a test voltage applied on the DUT can be set optionally ranging from 5V to 1400V, and then get the current reading of the DUT. Therefore a Volt-Ampere Characteristic of the DUT can be obtained at “CC” or “CV” mode.

2.4 Test Operation

There are three methods to start a test operation:

- i. Pressing the “Test” button
- ii. Using “Remote control” option
- iii. A special test jig provided by the producer of the tester.

With these 3 test operation methods, the CJ1001 provide ultimate test flexibility.

3 Specifications

Temperature:	10 °C – 30 °C
Air Pressure:	86 - 106 kPa
Power:	50 Hz \pm 2Hz, 220V \pm 10%, 220VA
Output voltages:	5-1400 V in five ranges: 70V, 200V, 600V, 1000V, 1400V.
Tolerances of voltage readings:	\pm 0.5% +2 digit
Output current:	0-5mA in four ranges: 20 μ A, 200 μ A, 2mA, 5mA
Tolerances of current readings:	\pm 2% +0.2 μ A.
Ripple factor of output voltages:	\leq 1% +0.1V.
Test current for varistor voltages:	10 μ A \pm 10%, 100 μ A \pm 5%, 1mA \pm 2%, 3mA \pm 2%.
Polarities:	Positive and Negative
Dimensions:	140cm \times 380cm \times 420cm (H \times W \times D)
Weight:	15 KG

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4 Safety Summary

To avoid potential hazards, use the product only as specified.

4.1 High Voltage

The tester will generate voltage up to 1400V. Contact of the conducting parts of the device under test is prohibited.

4.2 Do Not Operate in Wet/Damp Conditions

To avoid electric shock, do not operate this product in wet or damp conditions.

4.3 Use Proper Supply Voltage

Before applying power, ensure that the supply voltage is suitable for the tester as specified in the specifications.

4.4 Do Not Operate With Suspected Failures

If you suspect there is damage to this product, have it inspected by qualified service personnel.

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5 Getting Start

5.1 Front Panel

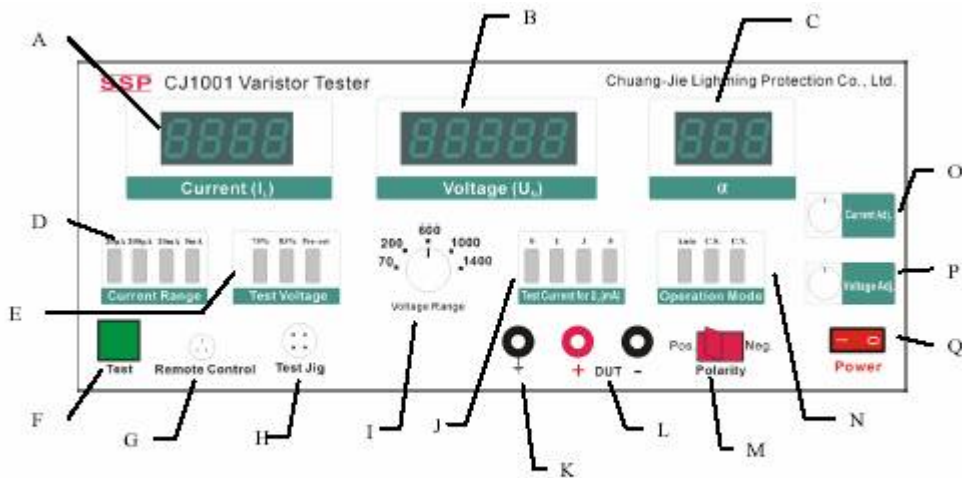


Fig. 1 Front Panel of the CJ1001

A: Reading of leakage current I_L

B: Reading of nominal voltage U_N

C: Reading of non-linear index α

D: Current range switch

E: Test voltage switch

F: Start test button

G: Remote control connector

H: Test jig connector

I: Voltage range selector

J: Test current (I_N) switch

K: Earth connection for calibration **ONLY**

L: Connector for the device under test

M: Polarity switch

N: Operation mode switch

O: Current adjustment

P: Voltage adjustment

Q: Power switch



*The Earth connector in the front panel is for calibration **ONLY!** For earthing purpose, please use the protected earth connector at the back of the tester.*

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5.2 Preparing the CJ1001 tester for use

Fig.2 shows the back side of the CJ1001 tester:

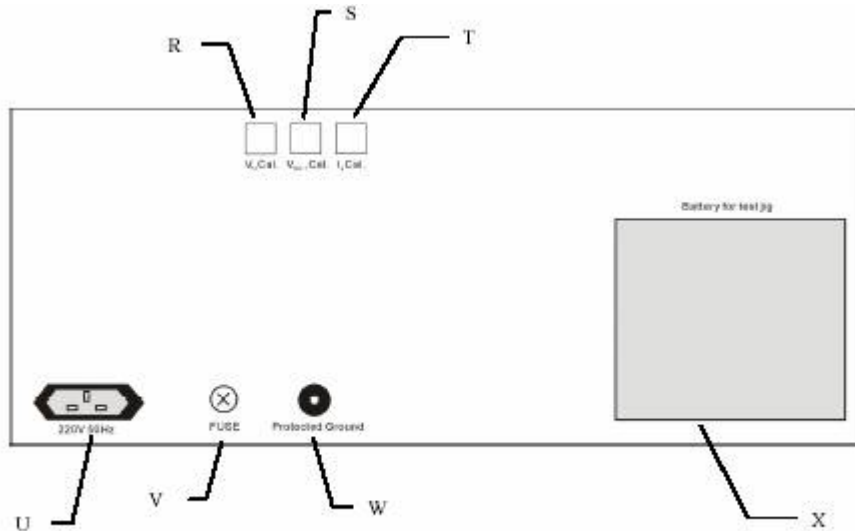


Fig. 2 Back of the CJ1001 tester

R: Calibration of VN

S: Calibration of VNO.1

T: Calibration of IL

V: Fuse

W: Protected earth

X: Battery box

U: Power cord connector

5.2.1 Connecting the power

Connect a suitable power cord to the power cord connector (U).
Before connection, please make sure the supplied power is comply with the operation power specified in the specification.

5.2.2 Fuse

If the fuse was broken, replace it with a fuse with parameter suitable for the tester.

5.2.3 Battery Box

2 “D” size battery must be installed in the battery box when the test jig connector was used. Please make sure the batteries in the battery box provide enough voltage.



The battery voltage must be higher than 1.3V under 3mA current

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6 Functions Control

Location of the buttons/switches may refer to *Fig. 1*.

6.1 Current Range

Select the current range to be measured and tested.

6.2 Test voltage

6.2.1 Under “Auto” operation mode

The test voltage to test leakage current was defined as follow:

- i. 75%: voltage applied is 0.75UN
- ii. 83%: voltage applied is 0.83UN
- iii. Pre-set: Any pre-set voltage

6.2.2 Pre-set voltage

- i. Switch the operation mode to “C.V.”
 - ii. Adjust the voltage show in the UN reading to the wanted voltage by adjusting the “Voltage Adj.” switch.
 - iii. Switch the operation mode to “Auto”
 - iv. Switch the “Test Voltage” to “Pre-set”
- (The three test voltage modes only function in “Auto” operation mode.)*

6.3 Voltage Range

Switch the upper limit of the voltage output. To ensure the accuracy of the measurement, the voltage range should set to the lowest possible range which supplies enough voltage.

6.4 Test Current for UN (mA)

Select the current for testing nominal voltage UN under “Auto” operation mode.

6.5 Operation Mode

Select the operation mode of the tester.

6.5.1 “Auto” Mode

The tester will perform one test circle after pressing the “Test” button, measure the nominal voltage UN, leakage current IL and calculate the non-linear index α .

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6.5.2 “C.C.” Mode

“C.C.” constant current mode switches the tester to act as a constant current supply. When “Test” button was pressed, there will be current output. The value of the output current could be set by adjusting the “Current adj.” switch. The value of the output current will be shown on the “Current (IL)” display, the responded voltage across the load will be shown on the “Voltage (UN)” display.

The output current range must set by the “Test Current for UN” switch. Example: “Test Current for UN” switch was set to 1mA, max current output of C.C. mode will be 1mA.

6.5.3 “C.V.” Mode

“C.V.” constant voltage mode switches the tester to act as a constant voltage supply. When “Test” button was pressed, there will be voltage output. The value of output voltage could be set by adjusting the “Voltage adj.” switch. The value of the output voltage will be shown on the “Voltage (UN)” display, the responded current flow through the load will be shown on the “Current (IL)” display.

The output range of the voltage could be set by adjusting the “Voltage Range” switch.

6.6 “Test” button

At “Auto” operation mode, “Test” button is used to start the test procedure. At the “C.C.” or “C.V.” operation mode, “Test” button was used to output the selected current and voltage respectively.

6.7 “Remote Control” Connector

Only function under “Auto” operation mode. “Remote Control” connector was used to connect the specific test jig for testing of lightning protective module.

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6.8 “Test Jig” Connector

“Test Jig” connector was used to connect a specific auto-operate test jig. To use this test jig, connected the 4 pin connector of the test jig to the “Test jig” connector of the front panel. Set the polarity to positive, operation mode to “Auto”, insert the device to be tested to the test jig, the test would start testing automatic without pressing any button.

6.9 Connector

This is the earthing connector of the tester, only used for calibrating the equipment.



Never connect the  connector to earth.

6.10 Polarity

Switch the output current polarity:
Positive: current of DUT connector is flow from positive to negative.
Negative: current of DUT connector is follow from negative to positive.

7 Operation

7.1 Power Connection

Connect the tester to the power supply which provide 220V 50Hz AC. Switch on the tester and wait 3 minutes to warm up.



Before connection, please made sure the supplied voltage is 220V 50Hz AC..

7.2 DUT/Test Jig Connection

Connect the responded test jig for the device to be tested, or direct connect the device to the DUT connector.



Please make sure the polarity is correct to prevent any hazards.

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7.3 Auto measurement

Switch the operation mode to “Auto”. Set the “Test Current” and “Test Voltage” according to the device under test, switch a suitable “Current Range” and “Voltage Range”. Press the “Test” button, and wait the readings to be stable.

7.4 Constant voltage output

Switch the operation mode to “C.V.”. Set the “Voltage Range” according to the voltage needed, adjust the output voltage by the “Voltage Adj.”. Press the “Test” button to output the voltage selected. The output will stop if the “Test” button was released. The α reading was meaningless under this operation mode.



High voltage will be generated when the “Test” button was pressed.

7.5 Constant current output

Switch the operation mode to “C.C.”. Set the “Test Current” according to the maximum current needed, adjust the output current by the “Current Adj.”. Press the “Test” button to output the current selected. The output will stop if the “Test” button was released.



High voltage will be generated when the “Test” button was pressed.
