

# RDXZF-100kVA/20kV Series Resonant Device With Variable Frequency



## One. Applicable Scope:

Test object	Capacitance	Test frequency	Test voltage	Test time
3km 6kV/300mm <sup>2</sup> cable	≤1.41μF	30~300Hz	≤15kV	15min

## Two. Technical Specifications

1. Rated voltage:

Output voltage	Purpose	Working frequency	Test voltage	Test time
20kV	6kV cable	30~300Hz	≤15kV	15min

2. Waveform distortion of output voltage waveform: <1.0%
3. Allowable continuous working time: 60 minutes at one time under rated conditions;
4. Quality factor of this device: Q>50
5. Quality factor of GIS, switch and other tests at full load: Q>20 (load related)
6. Input power: three-phase 380V or single-phase 220V
7. Frequency regulation range: 30Hz~300Hz
8. System measuring accuracy: 1.5%
9. The device has over-voltage, over-current, zero start and other protection functions.

## Three. Main Features

1. The required power capacity is greatly reduced. The serial resonant power supply generates HV and HC by resonant reactor and capacitor resonance of test object. In the whole system,

the power supply only needs to provide the part of active power consumption in the system, so the power required for the test is only  $1/Q$  of the test capacity.

2. The weight and volume of the device is greatly reduced. The serial resonant power supply eliminates the bulky high-power voltage regulating device and common high-power power frequency test transformer, and the resonant excitation power supply only needs  $1/Q$  of the test capacity, which greatly reduces the weight and volume of the system, which is generally  $1/10-1/30$  of the ordinary test device.
3. To improve the waveform of output voltage. The resonant power supply is a resonant-type filter circuit, which can improve the waveform distortion of the output voltage, obtain a good sinusoidal waveform, and effectively prevent the false breakdown of the harmonic peak to the test object.
4. To prevent large short-circuit current from burning the fault point. Under the condition of series resonance, when the insulation weakness of the test object is broken down, the loop will immediately tune off and the loop current will rapidly drop to  $1/Q$  of the normal test current. However, when parallel resonance or test transformer is used for withstand voltage test, the breakdown current will rise tens of times immediately. Compared with the two, the short-circuit current and the breakdown current are hundreds of times different. Therefore, the series resonance can effectively find the insulation weakness, and there is no worry that the large short-circuit current burns the fault point.
5. There will be no recovery overvoltage. Due to the breakdown of the test object, the resonance condition is lost, the HV disappears immediately, the electric arc is extinguished instantly, and the re-setting process of recovery voltage is very long and easy to disconnect the power supply before reaching the flashover voltage again. The recovery process of flashover voltage is an intermittent oscillation process of energy accumulation, and the process is long without any recovery overvoltage.
6. The device has over-voltage, over-current, zero start, system detuning (flashover) and other protection functions. The over-voltage and over-current protection value can be set on the base of the user's needs. When the test object flashes over, the flashover protection is activated, and the flashover voltage value can be recorded for test analysis.
7. The weight of the complete device is very light, which is convenient for field use.
8. The device has three working modes, which is convenient for users to choose flexibly subject to site conditions and improve the test speed.
9. Working modes: automatic mode, manual mode, automatic tuning & manual boost mode
10. It can remote store and print data. The number of stored data is digital, which is convenient for users to identify and search.
11. When the device sweeps frequency automatically, the beginning frequency point can be set arbitrarily within the specified range, and the scanning direction can be selected upward and downward. At the same time, the scanning curve is displayed on the LCD screen, which is

- convenient for the user to intuitively find out whether to discover the resonance point.
12. Using DSP platform technology, it is convenient to increase or decrease functions and upgrade subject to user's needs, and also makes HMI more humanized.

#### **Four. Description of main device configuration and technical parameters:**

##### **1. RDJLB-6kVA/1kV/0.4kV Excitation transformer 1 Pc**

- 1) Rated capacity: 6kVA;
- 2) Input voltage: 0~400V, single phase;
- 3) Output voltage: 1kV
- 4) Structure: dry type;

##### **2. RDXZ-6kVA/380V Variable frequency power control box 1 PC**

- 1) Rated output capacity: 6kW
- 2) Working power supply: 220/380±10% V (single/three phase), power-frequency
- 3) Output voltage: 0~400V, single phase,
- 4) Rated input current: 9A (three-phase)
- 5) Rated output current: 15A
- 6) Voltage resolution: 0.01kV
- 7) Voltage measuring accuracy: 1.5%
- 8) Frequency regulation range: 30~300Hz
- 9) Frequency regulation resolution: ≤0.1Hz
- 10) Frequency stability: 0.1%
- 11) Operation time: continuous 60min under rated capacity
- 12) The maximum temperature of components and parts are less than or equal to 65K when it runs continuously for 5min under rated capacity;
- 13) Noise level: ≤50dB

##### **3. RDDK-5kVA/20kV HV electric reactor 2 Pcs**

- 1) Rated capacity: 50kVA;
- 2) Rated voltage: 20kV;
- 3) Rated current: 2.5A;
- 4) Inductance: 30H/set;
- 5) Quality factor:  $Q \geq 30$  ( $f=45\text{Hz}$ );
- 6) Structure: dry type;

##### **4. FC-20kV/5000pF AC voltage divider 1 Pc**

- 1) Rated voltage: 20kV;
- 2) HV capacity: 5000pF
- 3) Dielectric loss:  $\text{tg}\sigma \leq 0.5\%$ ;
- 4) Voltage division ratio: 1200:1
- 5) Measuring accuracy: virtual value 1.5 level;

### Five. Configuration Table

No.	Devicename	Specification	Unit	Quantity
1	Excitation transformer	RDJLB-6kVA/1kV/0.4kV	Pc	1
2	Variable frequency power control box	RDXZ-6kVA/380V	Pc	1
4	HV electric reactor	RDDK-5kVA/20kV	Pc	4
5	AC voltage divider	FC-20kV/5000pF	Pc	1
6	Test line		Set	1