Characteristics and Parameters of Variable Frequency Series Resonance Test Equipment

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I. Product Introduction

According to the principle of series resonance, the variable frequency series resonance test equipment utilizes exciting transformer to stimulate series resonance circuit and adjust output frequency of variable frequency controller, resulting in circuit inductance \( L \) and test object \( C \) in series resonance. The resonance voltage is the voltage applied on the test object. The variable frequency resonance equipment is widely applied in the electric power industry, metallurgical industry, petroleum and chemical industry etc. It is also suitable for hand-over and preventive test for capacitive test objects with high capacity and voltage.

The HFRS series resonance withstand voltage equipment is mainly composed of variable frequency controller, exciting transformer, high-voltage reactor and high-voltage divider etc. The variable frequency controller is classified into two categories: controllable table model for 20kW and above while portable box model under 20kW. It is made up of controller and filter. The main function of variable frequency controller is to convert 380 or 200V power-frequency sine AC with fixed amplitude and frequency into sine wave with adjustable amplitude and frequency, and also provide the power for the whole equipment. The exciting transformer plays a role in raising the voltage outputted by variable-frequency power source to reasonable test voltage. The high-voltage reactor \( L \) is an important component of resonance circuit. When the frequency of power source is equal to \( 1/(2\pi\sqrt{LCX}) \), the series resonance occurs between reactor \( L \) and test object \( CX \).
This equipment is suitable for many tests, such as 10kV, 35kV, 110kV, 220kV and 500kV polyhexene cable AC withstand voltage test; 60kV, 220kV and 500kV GIS AC withstand voltage test; power-frequency withstand voltage test of large transformer and generator; induction withstand voltage test of electric power transformer and grounding resistance measurement etc.

II. Product Features

1. High stability and reliability.

The system adopts imported power components as the core of power conversion. Both voltage output and frequency output are stable. The design of electromagnetic compatibility (EMC) is reasonable and protection function is improved. The system is still kept in good condition despite many times of high-voltage grounding short circuit tests. Meanwhile, the system also has strong overload capability.

2. Strong function of automatic tuning

When the system tunes automatically, automatic sweep frequency occurs from 30Hz to 300Hz and the curve of sweep frequency is displayed. Users can visually observe the whole process of tuning; after the sweep frequency is completed, based on the preliminary resonance frequency points, the system takes 0.01Hz as the resolution ratio to conduct careful sweep frequency within the range of ±5Hz, and precisely locks the resonance frequency at last.

3. Be supportive of various test modes

The system is supportive of test modes, such as "automatic tuning + manual voltage regulation", "automatic tuning + automatic voltage regulation", manual tuning + manual voltage regulation" etc. The mode "automatic tuning + manual voltage regulation" with higher safety is recommended, which can not only quickly detect resonance point, but also control the test process via manual voltage regulation.

4. Friendly HCl interface
Setting of test parameters, test control and test results are shown at the same screen. The system also has functions, such as automatic timing, operation prompt, test data storage and searching. Full touch screen operation and display.

5. Perfect protection function
The system has zero potential protection (the system is not allowed to start if control button of voltage output is not at the zero position), over-voltage protection, over-current protection and flash protection etc, ensuring the reliability of system.

III. Product Parameter

- Resonance voltage waveform: sine wave, waveform distortion rate < 1.0%
- Output frequency: 30 ~ 300Hz
- Working system: under full power output, duration: 60min
- Quality factor: 30 ~ 80
- Input power source: single phase 380/220V±10%, 50Hz
- Environment temperature: -10°C ~ +50°C
- Relative humidity: < 95% , no dewdrop