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**INDUSTRY STANDARD OF THE
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**Field test code of SFC-based starting system for gas turbine
generator unit**

燃气轮发电机静止变频启动系统现场试验规程
(English Translation)

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009 "Guidelines for Standardization Work Part 1: Standard Structure and Compilation".

1 Scope

This standard specifies the test items, test methods and test criteria for the field test of the gas turbine generator static frequency conversion starting system.

This standard applies to the field test of the gas turbine generator static frequency conversion starting system.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this article Pieces. For undated references, the latest version (including all amendments) applies to this document.

GB/T 15135 Gas Turbine Vocabulary GB 50150 Electrical equipment installation engineering electrical equipment handover test standard DL/T 596 Preventive test procedures for electrical equipment

3 Terms and definitions

The following terms and definitions defined in GB/T 15135 apply to this standard.

Static frequency converter; SFC it is composed of a thyristor converter bridge, a DC smoothing reactor, a cooling system and a control and protection unit, and a device with

variable frequency power output capability Prepared.

SFC-based starting system it is composed of static frequency converter, input circuit breaker, isolation transformer, filter (optional), output switch A system in which the generator is driven from the cranking speed to the self-sustaining speed.

Input circuit breaker it is configured on the input side of the static frequency converter, connected to the power supply of the static frequency conversion starting system and the circuit breaker of the isolation transformer.

Isolation transformer for the step-down transformer configured between the input circuit breaker and the static inverter, the low-voltage side winding can be single winding or different phases.

Bit dual winding.

Output transfer switch Configured on the output side of the static inverter, a switch with switching function.

4.1 Test items and cycle

The field test includes handover test and regular test. For specific test items, see Table 1 and Table 2. The period of regular test is generally 1 to 3 years.

4.2 Test preparation

4.2.1

Before the test, a test program shall be formulated in accordance with the unit's infrastructure or maintenance plan. The test program shall include the test purpose, test basis, and test strips.

Parts, test items, test procedures, precautions, safety measures, time plan and organizational measures.

4.2.2

Prior to the test, each participating unit of the test shall refine the safety measures and prepare a safety isolation and emergency plan.

4.3 Test standards

The equipment handover test of the static frequency conversion starting system shall be carried out according to GB 50150 covered by GB 50150.

5.1 Insulation resistance test

The insulation resistance test requirements are as follows.

- a) Test conditions. The surface of the tested equipment should be clean and tidy, and the electrical circuit wiring of each equipment of the static frequency conversion starting system should be correct.
- b) Test method. Choose an insulation resistance tester suitable for the test voltage, see Table 3 for the test voltage.
- c) According to DL/T 596, the test criteria are shown in Table 3.

5.2 DC resistance test

The DC resistance test requirements are as follows.

- a) Test conditions. The surface of the tested equipment should be clean and tidy, and the electrical circuit wiring of each equipment of the static frequency conversion starting system should be correct.
- b) Test method. Choose a suitable DC resistance tester.
- c) According to DL/T 596, the test criteria are shown in Table 4.

5.3.1 Overvoltage protection test

The requirements for the overvoltage protection test are as follows.

- a) Test conditions. the static frequency conversion starting equipment has been correctly installed and passed the acceptance, disconnect the thyristor overvoltage protection device and the static frequency conversion Start the connection of the equipment and prepare for the test wave recording.
- b) Test method. Apply test voltage in parallel on both sides of the thyristor overvoltage protection device, gradually increase the test voltage until the device operates, Test voltage curve at the moment of operation of the measuring device.
- c) Test criterion. the deviation of the operating voltage from the design value does not exceed 10% of the design value.

5.3.2 Small current test of bridge

The requirements of the bridge low current test are as follows.

- a) Test conditions. The static frequency conversion starting equipment has been correctly installed and passed the acceptance test, disconnect the bridge and the isolation transformer, disconnect the network Bridge and machine bridge connection.
- b) Test method. Connect the three-phase voltage suitable for the test through a three-phase air circuit breaker at the input end of the network bridge, and connect an appropriate for resistive load, use an oscilloscope to observe the bridge output waveform. Start the static

frequency conversion start system, gradually change the trigger angle, remember Record the corresponding output DC voltage value. The output DC voltage can be calculated according to the following formula.

5.4 Functional test of cooling device

The functional test requirements of the cooling device are as follows.

- a) Test conditions. The static frequency conversion starting equipment has been correctly installed and passed the acceptance.
- b) Test method. Start the cooling device, check the auxiliary contacts and rotation direction of the cooling fan or cooling water pump.
- c) Test criterion. the state feedback of the auxiliary contact of the cooling fan or cooling water pump, the rotation direction of the cooling fan or cooling water pump is correct, the electric the machine is normal.

5.5.1 Signal circuit transmission test

The signal circuit transmission test requirements are as follows.

- a) Test conditions. The static frequency conversion starting system has been powered on, there is no abnormal alarm, there is no error in the related wiring, and the switching elements are in an open state.
- b) Test method. All operation, protection, limitation and signal circuits of the static frequency conversion starting system are tested according to the design logic.
check.
- c) Test criteria. to ensure compliance with design logic and supply requirements.

5.5.2 Analog unit test

The test requirements for analog units are as follows.

- a) Test conditions. The static frequency conversion starting system has been powered on and there is no abnormal alarm. Three-phase AC voltage source (output 0V~150V, 10Hz~55Hz, the error is not more than $\pm 0.5\%$), three-phase AC current source (output 0V~10A, 10Hz~55Hz, the error is not big Within $\pm 0.5\%$). Connect the three-phase AC voltage source and current source to the static frequency conversion starting equipment to simulate the grid-side voltage, grid-side current, Machine side voltage, machine side current.
- b) Test method.
 - 1) Grid side voltage. change the output value of the input voltage source within the range of