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**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Operation 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运行规程

(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 operating conditions, operation, monitoring and inspection, operation and maintenance of the gas turbine generator static frequency conversion start system.

This standard applies to static frequency conversion starting systems of gas turbine generator sets.

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 document.

For undated references, the latest version (including all amendments) applies to this document.

GB/T 3797 electrical control equipment GB/T 15135 Gas Turbine Vocabulary DL/T 572 Power Transformer Operation Regulations

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 set 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.

Normal starting

The static variable frequency start system drives the gas turbine generator set from the cranking speed to the self-sustained speed and then exits the working process.

Crank starting

When the gas turbine generator set is inspected, washed, and purged, the static frequency conversion starting system drives the gas turbine generator set from the cranking speed to purge speed, exit the working process after checking, washing and purging are completed.

Static frequency converter standby static frequency converter standby Refers to the static variable frequency start system in the "input circuit breaker disconnected, variable frequency unit thyristor turned off, trigger pulse blocking, output switch Auxiliary equipment such as disconnection and cooling unit outage", a state in which it cannot run immediately upon receiving a start command.

Static frequency converter hot standby Refers to the static variable frequency start system in the "input circuit breaker disconnected, variable frequency unit thyristor turned off, trigger pulse blocking, output switch Auxiliary equipment such as disconnection and cooling unit is running", the state can be run as soon as a start command is received.

4 General

4.1

Each power plant (station) shall, according to the performance and characteristics of the static variable frequency starting system adopted, formulate its own static variable frequency starting system operation procedures and static frequency conversion start system input/exit, isolation/recovery operation procedures.

4.2

The operating personnel are responsible for the operation of the static frequency conversion starting system, and conduct regular inspections and inspections of the static frequency conversion starting system equipment under their jurisdiction.

Check if any abnormalities or failures are found, deal with them in time.

4.3

The operating personnel should timely understand and grasp the technical changes of the equipment, and timely modify the operating procedures and related Operating procedures.

4.4

There should be detailed records of operations such as input/exit, isolation/recovery, etc. of the static frequency conversion starting system.

5.1 Operating environment

According to the provisions of GB/T 3797, the operating environment of the static variable frequency starting system should meet.

- a) The ambient air temperature does not exceed 40°C, and the average temperature within 24h does not exceed 35°C. The lower limit of ambient air temperature is 5°C;
- b) The relative humidity of the air when the maximum temperature is 40°C shall not exceed 50%. Allows a larger relative humidity at a lower temperature, for example for example, the relative humidity is 90% at 20°C, but the degree of condensation should be controlled;
- c) There should be no explosion hazard, no gases and dust that corrode metals and damage insulation;
- d) In areas with an altitude higher than 2000m, considering the reduction of dielectric strength and the weakening of air cooling effect, the operating environment is determined by the user.

Environment requirements.

5.2 Main technical documents

The main technical documents include.

- a) The technical specifications, operating instructions, user manuals of the static frequency conversion starting system and its equipment (see Appendix A and Appendix B for details), Operation and maintenance procedures, as-built drawings, test reports and parameter setting calculations, etc.;
- b) Related technical parameters of gas turbine generator set and excitation system;
- c) User application flow diagram and final software description text;
- d) Other technical documents provided by the manufacturer.

5.3 Excitation system

The excitation system should be able to operate reliably according to the design requirements, should be able to receive the control commands issued by the static frequency conversion starting system, and respond quickly.

5.4 Relay protection

During the static frequency conversion start of the gas turbine generator, the main protection should be switched on and off according to the requirements of Table 1, where "sqrt" means protection input, "x" it means protected withdrawal, "/" means that this standard does not require it.

6.1 Check before putting the static frequency conversion starting system into operation

6.1.1

It should be confirmed that relevant technical documents and spare parts are available before the first commissioning.

6.1.2

The equipment meets the specified performance and quality requirements after overhaul and debugging.

6.1.3

The signs of the equipment are complete, correct and clear, the switches, connecting pieces, and fuses are intact, and the wiring is correct.

6.1.4

All required power supplies are normal and reliable and can be put into operation as required.