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**INDUSTRY STANDARD OF THE
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DL/T 294.3-2019

**Specification for equipment of de-excitation and overvoltage
protection for generators Part 3??Rotor overvoltage protection
(English Translation)**

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Foreword

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

Please note that certain contents of this document may involve patents. The issuing agency of this document is not responsible for identifying these patents.

This standard was proposed by the Standardization Management Center of the China Electricity Council.

This standard is under the jurisdiction of the Electric Power Industry Hydropower Station Automation Standardization Technical Committee.

The "Technical Conditions for Generator De-excitation and Rotor Overvoltage Protection Device" is divided into four parts.

Technical requirements for generator de-excitation and rotor overvoltage protection device
Part 1: Field circuit breaker;

Technical requirements for generator demagnetization and rotor overvoltage protection device. Part 2: Non-linear resistance;

Technical requirements for generator demagnetization and rotor overvoltage protection device Part 3: Rotor overvoltage protection;

Technical requirements for generator de-excitation and rotor overvoltage protection device.
Part 4: Calculation of de-excitation capacity;

This standard is part 3.

Drafting organizations of this standard. Guodian Nanrui Technology Co., Ltd., State Grid Jiangxi Electric Power Co., Ltd. Electric Power Research Institute, Fujian Water Power Generation Group Co., Ltd., State Grid Zhejiang Electric Power Co., Ltd. Electric Power Research Institute Drafters of this standard. Xu Qipin, Xin Jianbo, Zhuang Ming, Xu Zaide, Wu Kuayu, Xie Yanjun, Xu Rong, Shi Yuhua, Xu Qizhi, Geng Min Biao, Wei Wei, An Ning for comments and suggestions during the implementation of this standard, please feedback to the Standardization Management Center of China Electricity Council (Baiguang, Xicheng District, Beijing) Lu Er Tiao No. 1, 100761).

This standard is issued for the first time.

Technical conditions of generator de-excitation and rotor overvoltage protection device Part 3: Rotor overvoltage protection

1 Scope

This standard specifies the technical requirements, test methods, inspection rules, technical requirements for synchronous generator (hereinafter referred to as generator) rotor overvoltage protection Technical documentation, packaging, transportation and storage requirements.

This standard applies to overvoltage protection of generator rotors with a single unit capacity of 10MW and above. Other capacities can be implemented by reference.

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 191 Packaging, storage and transportation pictorial signs DL/T 294.2 Technical conditions of generator demagnetization and rotor overvoltage protection device Part 2: Non-linear resistance DL/T 489 Test procedure for static rectifier excitation system of large and medium hydro-generator

3 Terms and definitions

The following terms and definitions apply to this document.

Rotor overvoltage

Refers to the overvoltage generated on the excitation winding during the operation of the generator, including thyristor commutation overvoltage and generator rotor slip overvoltage

Voltage and generator non-full-phase operation, non-synchronous grid connection, de-excitation, etc., a voltage exceeding a certain amplitude of the highest normal voltage is generated.

Electronic jumper crowbar Refers to the parallel connection of forward and reverse thyristors (reverse thyristors can be replaced by diodes) and the thyristor trigger circuit, which protects against overvoltage the component is connected to the circuit of the rotor overvoltage protection circuit.

Rotor overvoltage protection device Refers to the overvoltage protection component connected to the two ends of the rotor, or connected across the two ends of the rotor through electronic jumpers, mechanical switches, etc., to suppress A device for the amplitude of the rotor overvoltage.

4.1 Operating environment requirements

- a) Ambient temperature. $-5^{\circ}\text{C}\sim 45^{\circ}\text{C}$.
- b) Relative humidity. is not higher than 95% (no condensation).
- c) The altitude does not exceed.2000m (relevant parameters should be revised if it exceeds.2000m).

4.2 Basic requirements

4.2.1

The insulation resistance value of the rotor overvoltage protection device should not be less than 1Mohm. For the measurement method, refer to DL/T 489.

4.2.2

The withstand voltage of the rotor overvoltage protection device and the circuit connected to the rotor should not be lower than the rotor withstand voltage level;

4.3 Rotor overvoltage protection setting value

4.3.1

Should be higher than 1.2 times of the peak value of the normal maximum output voltage of the rectifier bridge;

4.3.2

Should be lower than 0.95 times of the reverse repetitive peak voltage value of the rectifier bridge thyristor;

4.3.3

Should be higher than the maximum voltage on the excitation winding during de-excitation;

4.3.4

It should be ensured that the instantaneous value of the overvoltage at both ends of the excitation winding is not higher than 70% of the voltage amplitude of the winding-to-ground withstand voltage test.

4.3.5

For units that allow asynchronous operation, it should be higher than the maximum voltage on the excitation winding during asynchronous operation.

4.4 Selection of overvoltage protection components

4.4.1

The voltage value when the component is operating should not be higher than the setting value of the jumper; it should not be lower than the voltage amplitude of the winding-to-ground withstand voltage test during the factory test.

50% (no requirement when de-excitation and over-voltage protection are shared).

4.4.2

Non-linear resistors should be used for overvoltage protection components;

4.4.2.1

Using zinc oxide non-linear resistance.

a) The design value of the zinc oxide resistance charge rate is generally not greater than 0.6, when it is greater than 0.6, a jumper should be configured;

b) Other requirements shall comply with DL/T 294.2.

4.4.2.2

Using silicon carbide nonlinear resistance.

a) Jumper should be configured;

b) Can be shared with demagnetization resistance.

4.5 When the instantaneous overvoltage is greater than the rotor overvoltage protection setting value, the overvoltage protection circuit should be turned on. When the overvoltage disappears, the overvoltage protection the protection circuit should be automatically shut off.

4.6 The rotor overvoltage protection device should have an overvoltage action alarm signal output function.

4.7 Electronic jumper.

a) When the over-voltage protection element is zinc oxide, the electronic jumper should