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

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**Specifications for generator-motor and transformer relay
protection equipment of pumped storage power plant
(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".

Please note that certain contents of this standard may involve patents. The issuing organization of this standard does not bear the responsibility for identifying these patents.

This standard was proposed and managed by the China Electricity Council.

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Company Zhejiang Qujiang Pumped Storage Branch Company, Henan Tianchi Pumped Storage Co., Ltd., China Southern Power Grid Co., Ltd. Peak and Frequency Modulation Power Generation Company Division, State Grid Xinyuan Holdings Co., Ltd. Technology Center.

1 Scope

This standard specifies the basic technology, functions, and functions of the generator motors, main transformers, and excitation transformer relay protection devices for pumped storage power stations.

Safety and other requirements, as well as test methods and inspection rules.

This standard is applicable to relay protection devices of fixed-speed pumped-storage generator motor transformer units with a single unit capacity of 150MW and above.

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 2900.1 Basic terminology for electrical engineering GB/T 2900.17 Electrical terminology measuring relay GB/T 2900.49 Electrical terminology electrical system protection GB/T 14598.24 Measuring relays and protection devices-Part 24: Power system transient data exchange (comtrade) general format GB/T 36550 Basic Terminology for Pumped Storage Power Station GB/T 32898 Pumped-storage generator motor transformer group relay protection configuration guide DL/T 478 General technical requirements for relay protection and safety automatic devices

3 Terms and definitions

Terms and definitions defined in GB/T 2900.1, GB/T 2900.17, GB/T 2900.49, GB/T 36550, GB/T 32898, DL/T 478 the meaning applies to this document.

The following symbols apply to this document.

I_N . The secondary rated current of the current transformer (TA).

U_N . The rated voltage of the primary side of the generator motor.

U_N . secondary rated line voltage of voltage transformer (TV).

P_N . Rated power of generator motor.

4.1.1 Normal working atmospheric conditions

a) Ambient temperature. $-10^{\circ}\text{C}\sim+55^{\circ}\text{C}$.

b) Relative humidity. 95% (no condensation or freezing inside the device).

c) Atmospheric pressure. 80kPa~106 kPa.

4.1.2 Environmental conditions for storage and transportation

The storage environment temperature is $-20^{\circ}\text{C}\sim+55^{\circ}\text{C}$, and the relative humidity is not more than 85%.

The transportation environment temperature is $-40^{\circ}\text{C}\sim+70^{\circ}\text{C}$, and the relative humidity is not more than 85%.

4.2.1 DC working power supply (auxiliary excitation quantity)

The requirements for the DC working power supply (auxiliary excitation) of the device are as follows.

- a) Rated voltage. 220V, 110V;
- b) Allowable deviation. $-20\%\sim+10\%$;
- c) Ripple coefficient. not more than 5%.

4.2.2 Incentive

The amount of excitation for the device is specified as follows.

- a) AC voltage rating. 100/3 V, 100V;
- b) AC current rating. 1A, 5A;
- c) Frequency rating. 50Hz.

4.2.3 DC circuit

The rated voltage range of the rotor voltage loop. 50V~600V.

4.3 General requirements

4.3.1

The protection functions of the generator motor should be integrated in the same protection device. The protection functions of the main transformer and the excitation transformer should be integrated in the same Inside the protection device.

4.3.2

The device shall have the function of identifying working conditions and be equipped with corresponding blocking logic. When the pumped storage unit is in various operating conditions or when the working conditions are changed, the installation the setting should not be moved by mistake or refused to move.

4.3.3

The device should have a hard pressure plate for the protection function to be switched in and out.

4.3.4

The relay in the device directly connected to the circuit breaker trip coil and the controller shall meet the requirements of DL/T 478.

4.3.5

When the device loses working power, the recorded information should not be lost.

4.3.6

The device should have interfaces for time synchronization, communication, debugging and printing.

4.3.7

The device should have hardware and software monitoring functions, and should automatically alarm, lock and record abnormalities.

4.3.8

The recording function of the device shall meet the following requirements.

- a) Record the whole process information of the protection action and have the function of storing more than 8 times;
- b) Convert, output or upload recorded data in accordance with GB/T 14598.24;
- c) Display, access or print of recorded information;
- d) Recording information includes operating components, operating time, switch displacement, self-check information, fixed value, pressure plate status and fault recorder.

4.3.9

Accuracy and variation, wiring terminal requirements, switch input and output, overload capacity, power consumption, electromagnetic compatibility requirements, absolute Edge requirements, mechanical requirements, and continuous energization performance should meet the requirements of DL/T 478.

4.3.10

The safety requirements of the device shall comply with the provisions of DL/T 478.

5.1.1 Longitudinal differential protection

The longitudinal differential protection shall meet the following technical requirements.

- a) The differential range including the electric brake short-circuit switch shall be locked