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

DL/T 996-2019

**Specification of steam turbine control system for thermal 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.

This standard is a revision of DL/T 996-2006 "Technical Conditions of Steam Turbine Electro-hydraulic Control System for Thermal Power Plants". Editability the main technical changes are as follows.

- Added the content of the digital electro-hydraulic control system (MEH) of the feedwater pump steam turbine.
- The standard applicable capacity is limited to units of 300MW and above.
- Terms and definitions have been updated in accordance with DL/T 701-2012.
- The original general regulations are changed to basic regulations, and the basic regulations only make overall requirements.
- The specific requirements and indicators in the original Chapter 8 technical specifications are incorporated into application functions, electronic control devices, and hydraulic systems.

Terms.

- Expanded and improved the man-machine interface, control function and other related content in the application function.
- The original electronic and protection system was changed to an electronic control device, and the relevant clauses were expanded.
- The original hydraulic and protection system was changed to a hydraulic system, and related clauses were expanded.
- Add two chapters on packaging, storage and testing.

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 China Electricity Council.

This standard is under the jurisdiction of the Power Industry Thermal Automation and Information Standardization Technical Committee (TC28).

Drafting organizations of this standard. Xi'an Thermal Power Research Institute Co., Ltd., Datang Binchang Power Generation Co., Ltd., Shanghai Electric Power Plant Equipment Co., Ltd., Datang Changchun Third Thermal Power Plant, Zhejiang Datang International Wushashan Power Generation Co., Ltd., China Power Engineering Consulting Group Northwest Electric Power Design Institute Co., Ltd.

1 Scope

This standard specifies the function, performance and technical requirements of steam turbine control systems in thermal power plants. Steam turbines in this standard the control system includes digital electro-hydraulic control system (DEH) and digital electro-hydraulic control system (MEH) of steam feed water pump and turbine.

This standard applies to steam turbine control systems for newly built or expanded thermal power plants with a unit capacity of 300MW and above. Other the steam turbine control system of the capacity unit can be implemented by reference. Other drive turbine control systems in thermal power plants can refer to this standard the relevant part is implemented.

2 Normative references

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

GB/T 2421.1 Overview and Guidelines for Environmental Testing of Electrical and Electronic Products GB/T 4208 Enclosure protection grade (IP code) GB/T 7596 Mineral turbine oil quality in power plant operation GB 11120 turbine oil GB/T 13384 General technical conditions for packaging of mechanical and electrical products GB/T 17214.1 Working conditions of industrial process measurement and control equipment Part 1: Climatic conditions GB/T 17626.2 Electromagnetic compatibility test and measurement technology Electrostatic discharge immunity test GB/T 17626.3 Electromagnetic compatibility test and measurement technology Radio frequency electromagnetic field radiation immunity test GB/T 17626.4 Electromagnetic compatibility test and measurement technology Electrical fast transient pulse group immunity test GB/T 17626.5 Electromagnetic compatibility test and measurement technology surge (impact) immunity test GB/T 17626.8 Electromagnetic compatibility test and measurement technology Power frequency magnetic field immunity test GB/T 17626.11 Electromagnetic compatibility test

and measurement technology Voltage sag, short-term interruption and voltage change immunity test GB/T 18271.3 General performance evaluation methods and procedures for process measurement and control equipment Part 3: Influence quantity Ringing test GB/T 26863-2011 Thermal power plant monitoring system terminology GB/T 29247-2012 General experimental methods for industrial automation instruments GB/T 30372 Guidelines for Acceptance of Distributed Control Systems in Thermal Power Plants GB/T 30370 Primary Frequency Modulation Test and Performance Acceptance Guide for Thermal Power Generating Set GB 50229 Code for fire protection design of thermal power plants and substations DL/T 571 Operation and Maintenance Guidelines for Phosphate Ester Fire-resistant Oil Used in Power Plants DL/T 656 Steam turbine control and protection system acceptance test procedures for thermal power plants DL/T 701 Terminology of Thermal Power Plant Automation

3 Terms and definitions

The following terms and definitions defined in DL/T 701 apply to this document. For ease of use, DL/T is listed repeatedly below Some terms and definitions in 701.

Digital electro-hydraulic control system (DEH) digital electro-hydraulic control system Consists of sensitive components designed according to electrical principles, digital circuits (computers), and amplifying components designed according to hydraulic principles Turbine control system composed of hydraulic servo mechanism. [DL/T 701-2012, definition 4.53].

Digital electro-hydraulic control system (MEH) micro-electro-hydraulic control system for feed water pump steam turbine A microcomputer and hydraulic servo mechanism are used to realize the control system of various functions of the feedwater pump and steam turbine.

Note: In fact, it is also a digital electro-hydraulic control system, but in order to distinguish it from the DEH of the main steam turbine, it is customarily called MEH.

[DL/T 701-2012, definition 4.59].

Unit coordinated control system (CCS) unit coordinated control system A main control system of a unit unit, whose function is to integrate boilers and turbo-generator units with large differences in dynamic characteristics.

Load balance control enables the unit to respond to the dispatched load change requirements as soon as possible, and guarantees the main steam pressure and the main operating parameters of the boiler the number is within the allowable range. In some specific working conditions, the protection of the control loop and control Stable and economical operation; mainly includes unit load command control, main control of furnace and furnace, pressure setting, frequency correction, and auxiliary machine failure Control loops such as load shedding; the directly acting execution level is the boiler control system and the steam turbine control system. [DL/T 701-2012, definition 4.16] 3.4 Speed control it is one of the functions of the steam turbine control system. During the startup, speed-up,