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**Technical requirements for dynamic response synchronous
condensers**

动态响应同步调相机技术要求

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part

1. Structure and drafting rules for standardization documents" Drafting is required. Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents. This document was proposed by the China Electrical Equipment Industry Association. This document is under the jurisdiction of the National Technical Committee for Standardization of Large Generators (SAC/TC 511). This document was drafted by: China Electric Power Research Institute Co., Ltd., Harbin Large Electric Machinery Research Institute Co., Ltd., State Grid Corporation of China Company, State Grid Economic and Technological Research Institute Co., Ltd., Harbin Electric Motor Factory Co., Ltd., Dongfang Electric Corporation Dongfang Electric Motor Co., Ltd., Shanghai Shanghai Electric Power Generation Equipment Co., Ltd. Shanghai Generator Factory, Nanjing NARI Relay Protection Electric Co., Ltd., NARI Technology Co., Ltd., Shandong Electric Power Company Electric Power Research Institute, State Grid Corporation of China North China Branch, Guangdong Energy Group Co., Ltd., State Grid Hubei Provincial Electric Power Co., Ltd. Electric Power Research Institute, Xiangtan Electric Motor Co., Ltd., China Southern Power Grid Peaking and Frequency Regulation Power Generation Co., Ltd. Energy Storage Research Institute of Science and Technology, Shandong University of

Science and Technology, Guangdong Alpine Electric Power Technology Co., Ltd., Inner Mongolia Electric Power (Group) Co., Ltd., Inner Mongolia Electric Power Science and Technology Research Institute branch. The main drafters of this document are. Li Zhiqiang, Sun Yutian, Jiang Weiyong, Guo Qiang, Wang Qing, Huang Hao, Wang Yong, Xian Zhelong, Yang Pengcheng, Huo Qiantao, Shi Xiangjian, Cao Zhiwei, Li Wenfeng, Guo Yanxia, He Fengjun, Ruan Mianzhao, Zhu Zhijia, Li Chaoke, Zhou Yu, Xiao Yang, Wang Dongyang, Zhou Cheng, Li Jixia, Shi Junjun, Qi Minglu, Ye Guohua, Cui Yibo, Guo Xiaoling, Li Yikai, Liu Qiang, Zhang Chao, Chen Hai, and Wang Lei. Technical requirements for dynamic response synchronous condenser

1 Scope

China's national technical requirements for dynamic response synchronous condensers. A synchronous condenser is a synchronous machine spinning without a prime mover, connected to the grid and doing nothing but supplying or absorbing reactive power. The technology is a century old and had been retired almost everywhere in favour of static compensators - and it has come back for reasons directly connected to renewable generation. A grid supplied largely by inverters has no rotating mass, so its frequency changes faster when a fault occurs, and no source of short circuit current, so its protection cannot detect faults reliably. A synchronous condenser supplies both: physical inertia and fault current, which no power electronic device can. Large numbers have been installed at HVDC converter stations and in weak areas of the Chinese grid, and their dynamic response is exactly the property those applications need specified.

1.General DL/T 801 Technical requirements for cooling water quality and system of large generators DL/T 861 Basic terms and terms for power reliability

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document.

GB/T 755 Ratings and performance of rotating electrical machines

GB/T 7064 Technical requirements for non-conductive pole synchronous generators

GB/T 7409.3 Synchronous motor excitation system Technical requirements for large and medium-sized synchronous generator excitation systems

GB/T 7894 Basic technical requirements for hydro-generators

GB/T 10068 Mechanical vibration of motors with shaft center height of 56 mm and above -

Measurement, evaluation and limits of vibration

GB/T 10069.1 Measurement methods and limits for noise from rotating electrical machines
Part

GB/T 20140 Measurement method and evaluation of dynamic characteristics and vibration
of stator winding ends of non-salient pole synchronous generators DL/T 793.1 Reliability
evaluation procedures for power generation equipment Part

JB/T 10392 Turbine generator stator frame, core dynamic characteristics and vibration test
methods and evaluation

3 Terms and definitions

The terms and definitions defined in DL/T 861 and DL/T 793.1 and the following apply to
this document.

3.1 dynamic response synchronous condenser It has fast dynamic reactive power
regulation and short-term overload capability, and is mainly used to provide dynamic
voltage support to the system, while also providing steady-state reactive power.
Synchronous condenser with compensation function.

3.2 Distributed condenser Dynamic response synchronous phase regulators with a capacity
of no more than 50 MVA are installed in renewable energy stations, collection stations and
other places.

4 Phase tuner operating environment

4.1 Installation type. indoor or outdoor.