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IEEE Guide for Voltage Regulation and Reactive Power Compensation at 1000 kV AC and Above

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Abstract: This guide applies to voltage and reactive power control in 1000 kV and above ac systems. It establishes criteria and requirements for electric power utilities in the planning, design, infrastructure, operation, and scientific research of voltage or reactive power in 1000 kV and above ac systems, which should guarantee the system stability and equipment safety.

Keywords: 1000 kV ac, IEEE 1860™, reactive power balance, ultra-high voltage, voltage adjustment, voltage deviation, voltage and reactive power, voltage regulating

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Introduction

This introduction is not part of IEEE Std 1860-2014, IEEE Guide for Voltage Regulation and Reactive Power Compensation at 1000 kV AC and Above.

With the extension of voltage levels, the security and reliability of high-voltage level electric equipment and power system are facing new challenges. There is a critical need to have a series of consensus technical criteria and requirements for voltage regulation and reactive power compensation for 1000 kV and above ac system to guarantee the reliability and safety operation of entire power system.

1000 kV ac transmission systems have been established and operated with full voltage in China; however, there is still a lack of suitable 1000 kV and above ac transmission system operation procedures and technical information for regulating voltage and compensating reactive power. Therefore, it is necessary to formulate a series of consensus technical requirements and criteria so as to facilitate the development of ultra-high voltage ac systems and ensure their normal operation.

This guide comprises 12 clauses and 6 annexes. Main content includes admissible voltage deviation, the characteristics of voltage and reactive power, basic principles, procedure of reactive power compensation, shunt compensation on the high-voltage side, shunt compensation on the low-voltage side, voltage regulating method and range of transformers, reactive power control of generators, and adjustment for operating voltage.

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1. Scope

This guide identifies basic principles for voltage regulation and reactive power compensation. This guide also provides acceptable voltage deviation limits range, as well as technical measures for voltage and reactive power adjustment and allocation in power systems at 1000 kV ac and above.

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