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

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**High voltage reactive power compensation device relay
protection configuration and tuning technical specifications
(English Translation)**

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Foreword

This standard is formulated in accordance with the rules given in GB/T 1.1-2009.

This standard was proposed by the China Electricity Council.

This standard is under the jurisdiction of the Power Industry Relay Protection Standardization Technical Committee.

Drafting organizations of this standard. Northwest Branch of State Grid Corporation, State Grid Gansu Electric Power Co., Ltd., Guangdong Power Grid Co., Ltd., Guangzhou Power Supply Bureau Co., Ltd., Xi'an Jiaotong University, Guangdong Power Grid Corporation Dongguan Power Supply Bureau, China Power Construction Group Northwest Survey, Design and Research Institute Co., Ltd.

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1 Scope

This standard specifies the high-voltage static var compensation device (hereinafter referred to as "SVC") and the static synchronous compensation device (hereinafter referred

to as "STATCOM") Technical principles of relay protection configuration and setting.

This standard is applicable to SVC and STATCOM connected to 35kV and above power transmission system and distribution system, other voltage levels can refer to implementation.

In this standard, SVC takes the thyristor control reactor type as an example, and STATCOM takes the chain type as an example. Other structure types can be implemented by reference.

Each high-voltage reactive power compensation device project has its particularity. This standard should be used according to the specific project conditions and requirements, and the corresponding should be added.

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 2900.1 Basic terminology for electrical engineering GB/T 2900.17 Electrical terminology measuring relay GB/T 2900.49 Electrician Terminology Power System Protection GB/T 14285 Technical Regulations for Relay Protection and Safety Automatic Equipment GB/T 20298 Static Var Compensation Device (SVC) Functional Characteristics DL/T 478 General technical requirements for relay protection and safety automatic devices DL/T 770 General technical conditions for transformer protection devices DL/T 1010.1-2006 High-voltage static reactive power compensation device Part 1 System design DL/T 1010.3 High-voltage static reactive power compensation device Part 3 Control system DL/T 1193-2012 Flexible transmission terms DL/T 1215.3 Chained static synchronous compensator Part 3: Control, protection and monitoring system NB/T 42043-2014 high voltage static synchronous compensation device

3.1 Terms and definitions

The following terms and definitions defined in GB/T 2900.1, GB/T 2900.17, and GB/T 2900.49 apply to this document.

3.1.1

Static var compensator A parallel controllable reactive power compensation device composed of static components adjusts the output by changing its capacitive or (and) inductive equivalent impedance, to maintain or control the specific parameters of the power system (typical parameters are voltage, reactive power).

[DL/T 1010.1-2006, definition 3.1] 3.1.2 Static synchronous compensator Static var generator A kind of voltage source converter which is connected in parallel to the system. Its output capacitive or inductive reactive current is continuously adjustable and can be used in the system.

Reactive power compensation device in the voltage range that has nothing to do with the system voltage. Static synchronous compensation device is also called static reactive power generator.

[DL/T 1193-2012, definition 4.1.2, with modification] 3.1.3 Thyristor controlled reactor the shunt reactor controlled by the thyristor continuously changes its equivalent inductance by controlling the conduction angle of the thyristor valve.

[DL/T 1010.1-2006, definition 3.1] 3.1.4 Chain static synchronous compensation device A kind of multi-level static synchronous compensation device whose converter adopts chain type (H bridge cascade) voltage source converter.

[DL/T 1193-2012 definition 4.3.3] 3.1.5 Interface reactor A reactor connected to the converter and AC system to realize the power exchange between the converter and the grid.

[NB/T 42043-2014 definition 3.9] 3.1.6 Interface transformer it is a transformer connected with SVC/STATCOM and AC system to realize power exchange between SVC/STATCOM and grid.

3.1.7

Filter/fixed capacitor A parallel device formed by a proper combination of capacitors and reactors (and sometimes resistors) has the functions of reactive power compensation, filtering and voltage regulation.

[DL/T 1010.1-2006, definition 3.5] 3.1.8 High and low voltage ride through of var compensator when an external fault or disturbance causes the voltage of the reactive power compensation device to increase or decrease, within the specified voltage fluctuation range and time in the compartment, the reactive power compensation device can ensure continuous operation without disconnecting from the grid.

3.2 Abbreviations

CT. current transformer PT. Voltage transformer SVC. Static var compensation device STATCOM. Static synchronous compensation device TCR. Thyristor Controlled Reactor FC. filter capacitor (

4 General

4.1

See Appendix A for the basic principles of SVC and STATCOM in this standard.

4.2

The configuration and setting of SVC and STATCOM relay protection should be coordinated with grid operation requirements.

4.3

In the planning and design stage, coordination of the selection of primary and secondary equipment should be done, and the adaptability of relay protection should be fully considered to avoid special wiring.

This method increases the difficulty of relay protection configuration and setting.

4.4

During the high and low voltage ride-through process, SVC and STATCOM should maintain grid-connected operation, and the relay protection cannot malfunction. Applied to wind power for SVC and STATCOM that have special needs such as access, photovoltaic access, and DC drop point, the relay protection should be able to meet the system operation requirements.

4.5

Follow the principle of "strengthening the main protection and optimizing the backup protection" for protection configuration and setting.

4.6

The adaptability of relay protection to SVC and STATCOM should be implemented first through the device's own principles and algorithms. At the same time, it should be combined Features Reasonable and correct setting of protection.

4.7

The fixed value setting of the protection device should meet the requirements of the protection function, and be as simple and easy to set as possible.

4.8

The relay protection of SVC and STATCOM should be relatively independent of the control system.

4.9

The protection functions and performance of SVC and STATCOM valve control systems shall comply with GB/T 20298, DL/T 1010.3, DL/T 1215.3, NB/T 42043 request.