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

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**Guideline for the standard voltages of medium and low voltage
DC distribution systems**

中低压直流配电电压导则

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Table of Contents

- 1 Scope
- 2 Terms and definitions
- 4 Medium voltage DC power distribution voltage

1 Scope

China's national guideline for the standard voltages of medium and low voltage direct current distribution systems. Distribution has been alternating current since the 1890s, for the reason that settled the war of the currents: AC could be transformed to a high voltage for transmission and back down for use, and DC could not. Power electronics removed that constraint, and the case for DC has been reopened by what is now connected to the grid. Photovoltaic arrays generate DC, batteries store DC, LED lighting and electric vehicle chargers consume DC, and data centres run on DC internally. In an AC distribution system each of those converts twice, losing a few per cent each time and adding equipment that can fail. A DC system removes those conversions. What has been missing is agreement on the voltages, because without it no equipment can be built for a general market - and that is precisely what this guideline supplies.

2 Terms and definitions

The following terms and definitions apply to this document.

2.1 DC power distribution system A power distribution system that exchanges electrical energy with the user's electrical system in a DC mode.

2.2 nominal system voltage A given value used to mark or identify the system voltage. [GB/T 2900.50-2008, definition of 601-01-21]

2.3 DC power supply voltage The pole-to-pole or pole-to-earth voltage at the supply point of a DC power distribution system.

2.4 load distance On the premise of meeting the voltage requirements at the end of the line, the maximum distance to which unit power can be transmitted, and also can be converted into the maximum distance to which a certain power can be transmitted.

2.5 DC voltage deviation The relative deviation of the actual operating voltage from the nominal system voltage. > NOTE: DC voltage deviation is expressed in percentage.

3 General provisions 3.1 The determination of the voltage level of the DC power distribution system shall adhere to the principles of simplifying the voltage level, reducing the

transformation levels, and optimizing the network structure.

3.2 The determination of the DC distribution voltage level needs to consider the connection with the existing AC voltage sequence and the convenient access of new energy, energy storage, DC users, etc.

3.3 The determination of the voltage level of the DC power distribution system requires comprehensive consideration of the application range, capacity, power supply radius, voltage deviation, and safety.

3.4 The DC voltage conversion device or AC-DC conversion device included in the DC power distribution system mainly considers voltage source type.

3.5 The user power supply voltage level shall be determined at the above voltage level and based on comprehensive consideration of factors such as power capacity, characteristics of power equipment, power supply reliability, power supply radius, number of loops of power supply lines, the current status of the local public power grid and its development plan.

3.6 This standard defines 3000(± 1500) V~ ± 50 kV as the medium voltage range, and 110 V~1500(± 750) V as the low voltage range.

3.7 This standard specifies the voltage levels of medium and low-voltage public DC power distribution systems. Special power usage situations can be differentiated according to actual conditions.

4 Medium voltage DC power distribution voltage

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