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**Guideline for standard voltages of medium and low voltage  
DC distribution system  
中低压直流配电电压导则**

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# **Guideline for standard voltages of medium and low voltage DC distribution system**

## **1 Scope**

This standard specifies the voltage levels and voltage deviations that shall be followed for medium and low-voltage DC power distribution.

This standard applies to the planning, design, construction, and operation of DC power distribution of  $\pm 50$  kV and below.

## **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  $3000(\pm 1500)$  V~ $\pm 50$  kV as the medium voltage range, and  $110$  V~ $1500(\pm 750)$  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

When the nominal DC voltage is in the range of  $3(\pm 1.5)$  kV~ $\pm 50$  kV, the nominal voltage of the medium voltage DC power distribution system should be selected from Table 1. Please refer to Appendix A for the load distance of overhead lines in the medium voltage DC power distribution system.

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