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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 29321-2026

Replacing GB/T 29321-2012

Technical specification for reactive power compensation in photovoltaic power stations

光伏发电站无功补偿技术规范

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1.Structure and Drafting Rules of Standardization Documents". Drafting. This document replaces GB/T 29321-2012 "Technical Specification for Reactive Power Compensation of Photovoltaic Power Stations". Compared with GB/T 29321-2012, except for... Aside from structural adjustments and editorial changes, the main technical changes are as follows:

a) The scope has been changed from "applicable to grid connection at voltage levels of 35kV and above" to "applicable to grid connection at voltage levels of 10kV and above". Level-based grid connection (see Chapter 1, Chapter 1 of the.2012 edition);

b) The terms and definitions for "outgoing lines" and "voltage qualification rate" have been removed (see

3.6 in the.2012 edition);

c) A "General Requirements" section has been added (see Chapter 4);

d) Integrate the content on "Reactive Power Supply" into the overall requirements (see Chapter 4, Chapter 5 of the.2012 edition);

e) Increased technical requirements for electrochemical energy storage converters installed in photovoltaic power plants (see 4.4);

f) Added the requirement that photovoltaic power plants should coordinate the reactive power compensation device and the tap changer of the main transformer for voltage

regulation (see 4.5);

g) Changed "Reactive Power Capacity" to "Reactive Power Capacity and Configuration," adding information on the reactive power capacity and configuration for photovoltaic power plants connected to weak power grids. The device should be adapted to the requirements of low short-circuit ratio operating conditions (see Chapter 5, Chapter 6 of the.2012 edition);

h) The content on "voltage deviation" has been integrated into the "voltage regulation" chapter, and the reactive power and voltage control performance of photovoltaic power plants should meet the following requirements. The need for regulation under rapid fluctuations in active power increases the requirement for dynamic reactive power compensation devices to respond when the control point voltage exceeds the set range. Technical requirements for automatically switching from other control modes to constant voltage control mode with hysteresis control (see Chapter 6,.2012 edition) Chapter 4);

i) Change "The absolute value of reactive power control deviation shall not exceed 5% of the given value" to "The difference between reactive power and command value shall not exceed the electrical..." ±1% of the station's rated power (see 7.1.4, 7.2.4, and

9.2.4 in the.2012 edition);

j) The section on "Reactive Power Compensation Devices" has been removed (see Chapter 7 of the.2012 edition);

1 Scope

GB/T 29321-2026 is the Chinese national standard covering the reactive power a PV plant must be able to supply or absorb - from the inverters themselves and from any additional compensation equipment, and the control that holds the voltage at the connection point. It replaces GB/T 29321-2012 and has been in force since 1 September 2026. It was issued on 27 February 2026 and has been in force since 1 September 2026, replacing GB/T 29321-2012. This page is published from the official record of the 2026 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document specifies the general requirements for reactive power compensation technology in photovoltaic power plants, including reactive power capacity and configuration, voltage regulation, and reactive power voltage control systems. The system requirements are outlined, and the corresponding verification methods are described. This document applies to the design, commissioning, operation, and maintenance of newly built or renovated (expanded) photovoltaic power stations connected to the grid at voltage levels of 10kV or above. Repair and maintenance.

4 General Requirements

4.1 The reactive power source of a photovoltaic power station should include the photovoltaic inverter and the centrally installed parallel capacitors, parallel reactors, and static var compensators. Reactive power compensation devices such as compensators, static var generators, and synchronous condensers; photovoltaic power stations equipped with electrochemical energy storage; reactive power sources include electrochemical... Learn about energy storage converters.

4.2 Photovoltaic power plants should make full use of the reactive power capacity and regulation capabilities of photovoltaic inverters. Photovoltaic power plants equipped with energy storage should make full use of the reactive power capacity and regulation capabilities of photovoltaic inverters. Reactive power capacity and regulation capability of inverters and electrochemical energy storage converters.

4.3 The reactive power output range of the photovoltaic inverters installed in the photovoltaic power station shall meet the requirements of GB/T 37408.

4.4 The reactive power output range of the electrochemical energy storage converter installed in the photovoltaic power station shall meet the requirements of GB/T 34120.

4.5 The dynamic reactive power compensation device installed in the photovoltaic power station should have automatic control functions, including constant voltage control, constant power factor control, and It has control modes such as fixed reactive power control, and has the function of switching between manual/automatic and remote/local modes.

4.6 Photovoltaic power stations should be equipped with reactive power and voltage control systems, which should be able to automatically adjust the power supply and demand of the photovoltaic power station according to the instructions of the power system dispatching agency. Reactive power control. To keep the grid connection voltage of the photovoltaic power station within the normal range, the reactive power and voltage control system should be able to meet the requirements for adjustment speed and control accuracy. Requirements for voltage regulation in power systems.

4.7 The dynamic reactive power response time of a photovoltaic power station should not exceed 30ms.

5 Reactive power capacity and configuration

5.1 The reactive power capacity of photovoltaic power plants shall comply with the provisions of GB 38755 and meet the requirements of basic balance in power system hierarchy and zoning. Capacity configuration should consider optimizing voltage regulation methods and reducing line losses, while also meeting maintenance and standby requirements.

5.2 The reactive power capacity and configuration of photovoltaic power stations shall meet the requirements of GB/T 19964.For photovoltaic power stations connected to weak power

grids, their reactive power capacity shall meet the requirements of GB/T 19964. The power capacity and configuration should be adapted to low short-circuit ratio operating conditions. If necessary, a special study should be conducted to consider the reactive voltage characteristics of the connected power system. Sure.

5.3 When the reactive power capacity of the photovoltaic inverter and energy storage converter cannot meet the voltage regulation requirements of the power system, the photovoltaic power station should be equipped with... Reactive power compensation device. Photovoltaic power stations can install reactive power compensation devices on the low-voltage side of the step-up transformer. Photovoltaic power stations without a step-up transformer can... A reactive power compensation device is installed at the collection point.

5.4 The main transformer of a photovoltaic power station should preferably be an on-load tap-changing transformer.

6.1 Voltage Deviation

6.1.1 When the grid voltage is within the normal range, photovoltaic power stations connected to the grid via voltage levels of 35kV~110kV should be able to connect to the grid. The voltage at the network point is adjusted to 97%~107% of the nominal voltage; the voltage deviation after the accident is ±10% of the nominal system voltage.

6.1.2 When the grid voltage is within the normal range, photovoltaic power stations connected to the grid at a voltage level of 220kV or above should be able to achieve grid connection. Adjust the point voltage to within 100%~110% of the nominal voltage; the voltage deviation after the accident should be -5% of the system nominal voltage. 10%.

6.2 Adjustment Method

6.2.1 The ways in which photovoltaic power plants participate in grid voltage regulation should include regulating photovoltaic inverters, electrochemical energy storage converters, and reactive power compensation devices. The reactive power of the device and the tap changer of the main transformer in the photovoltaic power station, etc.

6.2.2 The photovoltaic inverters, electrochemical energy storage converters, and dynamic reactive power compensation devices installed in photovoltaic power stations should be within their reactive power regulation range. The reactive voltage is controlled according to the instructions of the reactive voltage control system of the photovoltaic power station.

6.2.3 The reactive power voltage control performance of photovoltaic power plants should meet the regulation requirements under rapid fluctuations in active power.

6.2.4 When the dynamic reactive power compensation device adopts the constant voltage control mode, the control point should be set at the high-voltage side bus of the main transformer of the photovoltaic power station. When the control point voltage exceeds the