

ICS 27.160
CCS F 12



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

GB/T 44228.1-2024

Smart photovoltaic power station-Part 1: General

智能光伏电站 第1部分：总则

Issued on: July 24, 2024

Implemented on: July 24, 2024

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting is required.

This document is part 1 of GB/T 44228 Intelligent Photovoltaic Power Station. GB/T 44228 has published the following parts. Part 1: General. - Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents.

This document is proposed and coordinated by the China Electricity Council.

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Introduction

With the rapid development of information technology, the deep integration of technologies such as the Internet and artificial intelligence with the real economy has become a key factor in China's economic and technological development.

In order to actively respond to China's major strategic goals, the deep integration of new technologies such as artificial intelligence, big data, 5G and new energy power generation is the key to the development of China's optical fiber industry.

The development of photovoltaic technology is an inevitable trend. In the field of solar photovoltaic power generation, "smart photovoltaic" provides a new impetus for China to achieve its "dual carbon" goals.

Intelligent photovoltaic power station is based on automation, digitization and informatization, and uses cloud computing, big data, Internet of Things, mobile Internet, Artificial intelligence and other means have the ability of self-perception, self-learning, self-decision-making, self-execution and self-adaptation to achieve safety, stability, efficiency and autonomy At present, intelligent photovoltaic power stations have been widely used. GB/T 44228 "Intelligent Photovoltaic Power Station" aims to ensure Establish specifications that are generally applicable to the production, operation, inspection and maintenance of smart photovoltaic power stations, provide technical guidance for smart photovoltaic power generation, and help GB/T 44228 "Intelligent Photovoltaic Power Station" is planned to consist of 7 parts.

Part 1: General Principles. Aims to standardize the system architecture, intelligent operation, intelligent maintenance, and material management of smart photovoltaic power stations.

It sets the technical requirements for management, marketing management and safety management, and puts forward the overall program principles for the intelligentization of smart photovoltaic power stations.

Part 2: Intelligent working equipment. Aims to standardize the functions, performance and other technical requirements of intelligent working equipment. - Part 3: Intelligent integrated platform. Aims to standardize the architecture, functions, interface requirements and other technical requirements of the intelligent integrated platform.

Part 4: Intelligent Operation. Aims to standardize the relevant requirements for operation control of intelligent photovoltaic power stations. - Part 5: Intelligent maintenance and repair. Aims to standardize the relevant requirements for maintenance and repair of intelligent

photovoltaic power stations. - Part 6: Intelligent unified information model. Aims to specify the technical requirements of the intelligent unified information model. - Part 7: Evaluation of the degree of intelligence. Aims to standardize the evaluation of the primary, intermediate and advanced intelligence levels of smart photovoltaic power stations Methods and other related requirements.

Smart Photovoltaic Power Plant Part 1: General

1 Scope

This document specifies the overall requirements for smart photovoltaic power stations, including system architecture, smart operation, smart maintenance, material management, market Technical requirements for marketing management and safety management.

This document applies to the design, construction, acceptance, operation, inspection and maintenance of smart photovoltaic power stations, cluster-controlled smart photovoltaic power generation The system can be executed as a reference.

2 Normative references

GB/T 36572

3 Terms and definitions

The following terms and definitions apply to this document.

3.1 Smart photovoltaic power station

Based on automation, digitization and informatization, using cloud computing, big data, the Internet of Things, mobile Internet, artificial intelligence and other means, With self-sensing, self-learning, self-decision-making, self-executing and self-adapting capabilities, it can realize safe, stable, efficient and autonomous photovoltaic power generation. stand.

[Source. GB/T 40222-2021, 3.1, modified]

3.2 Digital twin

Digital simulation for understanding, predicting, and optimizing the performance of physical objects.

[Source. GB/T 40222-2021, 3.5]

4 General requirements

4.1 The construction of smart photovoltaic power stations should be integrated with the overall planning of multi-type and multi-scenario photovoltaic power generation, with the

functions of operation, maintenance, and materials.

Management, marketing management, safety management and other intelligent production and operation management capabilities.

4.2 Smart photovoltaic power stations should use intelligent devices and equipment to realize data collection and processing, and it is advisable to deploy an integrated management and control platform.

4.3 The network architecture of the smart photovoltaic power station should be planned as a whole, and the network security should comply with the requirements of GB/T 36572.

4.4 Smart photovoltaic power stations should establish a unified information model and coding system that is consistent with the actual physical layout.

4.5 Smart photovoltaic power generation should have the function of real-time linkage between information databases, and the function of automatically pushing information such as alarms and decisions in each link.

Intelligent photovoltaic power generation algorithms, models, and information databases should have the functions of autonomous learning, automatic optimization, and iterative evolution.

4.6 Smart photovoltaic power generation should support multi-source collection and cross-verification of information such as environment, equipment and facilities, production personnel and operation management, so as to achieve Interaction with relevant parties such as power grid dispatching and centralized control center.