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

GB/T 20513.1-2025

Replacing GB/T 20513-2006

Photovoltaic system performance - Part 1: Monitoring

光伏系统性能 第1部分：监测

(English Translation)

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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 is Part 1 of GB/T 20513 "Performance of Photovoltaic Systems". GB/T 20513 has already published the following parts.

---Part 1: Monitoring.

This document supersedes GB/T 20513-2006 "Guidelines for Performance Monitoring, Measurement, Data Exchange and Analysis of Photovoltaic Systems" and is consistent with...

Compared with GB/T 20513-2006, apart from structural adjustments and editorial changes, the main technical changes are as follows.

---Added "Terms and Definitions" (see Chapter 3);

---Added "Classification of Monitoring Systems" (see Chapter 4);

---An overview has been added (see Chapter 5);

---Change "Data Format" to "Data Acquisition Time and Report" (see Chapter 6, Chapter 6 of the 2006 edition);

---Added "Irradiance" (see Chapter 8);

---Added "Environmental Factors" (see Chapter 9);

---A "tracking system" has been added (see Chapter 10);

---Added "Electrical Measurement" (see Chapter 11);

---Change "Data Quality Inspection" to "Data Processing and Quality Inspection" (see Chapter 12, Chapter 7 of the 2006 edition);

---The monitoring methods, records, and exported parameters have been removed (see Chapters 4, 5, and 8 of the 2006 edition).

This document is equivalent to IEC 61724-1:2021 "Photovoltaic system performance - Part 1: Monitoring".

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the Ministry of Industry and Information Technology of the People's Republic of China.

This document is under the jurisdiction of the National Technical Committee on Standardization of Solar Photovoltaic Energy Systems (SAC/TC90).

Introduction

GB/T 20513, "Performance of Photovoltaic Systems," proposes methods for monitoring photovoltaic system performance, energy, and capacity assessment. GB/T 20513 is intended to be used by...

It consists of the following three parts.

---Part 1: Monitoring. The aim is to establish unified standards for photovoltaic system performance monitoring, data acquisition, transmission, and analysis to ensure...

The accuracy and comparability of its performance evaluation.

---Part 2: Capacity Assessment Methodology. The purpose is to define the measurement and analysis procedures for the capacity of specific photovoltaic systems, aiming to achieve this in a shorter timeframe.

Evaluate the performance quality of the photovoltaic system within a period of time (a number of days with relatively sufficient sunshine).

---Part 3: Energy Assessment Methodology. The purpose is to define procedures for measuring and analyzing the power generation of a specific photovoltaic system, aiming to address...

The photovoltaic system was tested under all relevant operating conditions and validated over a sustained period (typically one year).

Long-term expected power consumption to obtain all performance information.

Figure 1 illustrates the main elements that make up different types of photovoltaic systems. The main provisions of this document apply to systems without local load, energy storage, or auxiliary power.

The grid-connected system for the auxiliary power source is shown by the thick line in Figure 1. Annex E contains technical details of some systems with additional modules.

Photovoltaic arrays may include fixed-axis and tracking systems, as well as planar systems and concentrated photovoltaic systems.

Keywords.

RNE. Renewable Energy Source;

PCE. Power Conversion Device;

BDI. Bidirectional Inverter;

GCI. Grid-connected inverter.

Solid lines represent simple grid-connected photovoltaic systems without local loads, energy storage, or auxiliary sources.

Figure 1.Elements that may exist in a photovoltaic system

Performance monitoring systems serve a variety of purposes, including comparing design expectations with guaranteed performance, and detecting and locating faults.

When comparing performance design expectations and guarantees, the focus should be on the consistency between system-level data and prediction and testing methodologies.

To detect and locate faults, higher resolution at the sub-level of the system is preferable, and the repeatability and relevance of measurements should be emphasized.

The monitoring system should be adapted to the scale of the photovoltaic system and the user's needs. Generally, large-scale photovoltaic systems require more monitoring than small-scale and low-cost photovoltaic systems.

More monitoring points and higher precision sensors.

Photovoltaic System Performance Part 1: Monitoring

1 Scope

This document specifies the terminology, devices, and monitoring methods for photovoltaic system performance monitoring and analysis. This content can also serve as a basis for other data collection...

The data serves as the basis for the standards upon which the content is based.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.

This document.

ISO 9060:2018 Specification and classification of hemispherical solar irradiance and direct solar irradiance measuring instruments (Solarenergy-tion) ISO 9488 Solar Energy Vocabulary ISO/IEC Guide 98-1 Measurement Uncertainty Part 1: Introduction to the Expression of Measurement Uncertainty ISO/IEC Guide 98-3 Measurement Uncertainty Part 3: Guidelines for the Expression of Measurement Uncertainty (GUM.1995) [Uncertainty-] lary(IEV)-Part 131: Circuittheory] Note. GB/T 2900.74-2008 Electrical