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Photovoltaic system performance -
Part 2: Power performance index and capacity evaluation method

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CONTENTS

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FOREWORD

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IEC TS 61724-2 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems. It is a Technical Specification.

This second edition cancels and replaces the first edition published in 2016. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) Adapting the document for bifacial PV systems, in accordance with the latest edition of IEC 61724-1 and current industry practices.
b) Adapting the test procedure to account for the limited times of unconstrained system operation which are now common because of high DC-to-AC ratios (clipping) and interconnection limits (curtailment).
c) Adapting the test procedure to achieve a test that can be performed in a short time of three to five days during favorable conditions.

d) Focusing the document more heavily on the use of modern PV system modeling software to obtain the expected performance of the system under test.

e) Simplifying the mathematical procedure for calculating the test results.

f) Clearly identifying test elections (optional choices to be made in conducting the test) and providing a template for documenting these elections.

g) Clarifying the discussion of the test boundary that separates tested variables from untested variables.

h) Expanding and clarifying the discussion of data filtering.

The text of this Technical Specification is based on the following documents:

Draft	Report on voting
82/2386/DTS	82/2484/RVDTS

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Specification is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 61724 series, published under the general title *Photovoltaic system performance*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

This document defines a test of a PV system's power performance index (PPI). PPI, defined in IEC 61724-1, is the ratio of a system's measured power output under test conditions to its expected output at those conditions based on the system's design.

NOTE This type of test is sometimes referred to as a capacity test, whose result is a capacity test ratio, which is equivalent to PPI.

The test is intended to be performed over a short period of typically three to five days and is typically used to satisfy a contractual performance guarantee as part of the final completion of a PV power plant.

1 Scope

The test applies to grid-connected PV systems comprising at least one inverter.

The test evaluates the PV system only in conditions where output is unconstrained by limitations in AC power output from the inverters. Accordingly:

- Data used for the test is limited to times when inverters are maximum-power-point tracking, so that PV system output power is unconstrained by inverter limitations (clipping) or interconnection limits (curtailment).
- The maximum operational capacity of the system can ultimately be determined by maximum inverter output.

Results of a performance test can be affected by various choices made in the procedure. Therefore, this document clarifies how test choices ("test elections") affect the boundary between external variables and the part of the system being tested.

For a procedure that evaluates system performance over an extended period, including during constrained operation, refer to IEC TS 61724-3, *Photovoltaic system performance – Part 3: Energy performance evaluation method*.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61724-1:2021, *Photovoltaic system performance - Part 1: Monitoring*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC TS 61836 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

3.1
maximum-power-point tracking
inverter is maximizing the DC array's output power

3.2
unconstrained operation
operation when all inverters are freely performing maximum-power-point tracking

3.3
constrained operation
operation when output of inverter(s) is limited below the maximum possible by maximum-power-point tracking, due to either inverter maximum output capacity (clipping) or grid interconnection limits (curtailment)