PD IEC TR 60904-14:2020

BSI Standards Publication

Photovoltaic devices

Part 14: Guidelines for production line measurements of single-junction PV module maximum power output and reporting at standard test conditions

currently in preview, click buy full vers

bsi.

National foreword

This Published Document is the UK implementation of IEC TR 60904-14:2020.

The UK participation in its preparation was entrusted to Technical Committee GEL/82, Photovoltaic Energy Systems.

A list of organizations represented on this committee can be obtained on request to its committee manager.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2020
Published by BSI Standards Limited 2020

ISBN 978 0 539 14142 9

ICS 27.160

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 December 2020.

Amendments/corrigenda issued since publication

Date	Text affected

currently in preview, click buy full version

IEC TR 60904-14

Edition 1.0 2020-11

TECHNICAL REPORT

colour inside

Photovoltaic devices –
Part 14: Guidelines for production line measurements of single-junction PV module maximum power output and reporting at standard test conditions

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 27.160

ISBN 978-2-8322-9082-8

Warning! Make sure that you obtained this publication from an authorized distributor.

® Registered trademark of the International Electrotechnical Commission

urrently in preview, click buy full versi

CONTENTS

currently in preview, click buy full version

urrently in preview, click buy full versi

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

PHOTOVOLTAIC DEVICES –

Part 14: Guidelines for production line measurements of single-junction PV module maximum power output and reporting at standard test conditions

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a Technical Report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC TR 60904-14, which is a Technical Report, has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

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

Draft TR	Report on voting
82/1748/DTR	82/1785A/RVDTR

Full information on the voting for the approval of this Technical Report can be found in the report on voting indicated in the above table.

currently in preview, click buy full version

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60904 series, published under the general title *Photovoltaic devices*, 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 "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

urrently in preview, click buy full versi

PHOTOVOLTAIC DEVICES –

Part 14: Guidelines for production line measurements of single-junction PV module maximum power output and reporting at standard test conditions

1 Scope

This document provides guidelines for measurements of the maximum power (P_{max}) output of single-junction photovoltaic (PV) modules and for reporting at standard test conditions (STC) in industrial production line settings. Such measurements typically:

- Record current-voltage (I-V) data while illuminating the module with a solar simulator;
- Are performed on 100 % of manufactured modules, in order to determine whether they meet nameplate requirements for various bins spanning different power output levels.

This type of measurement is widespread and performed in high volume by PV module manufacturers worldwide. As it is desirable to have consistent measurement practices across the industry, this document describes the following features of such measurements:

- Essential elements, in order to provide common understanding;
- Common issues or complications;
- Sources of error and uncertainty, including recommendations to minimize them.

Understanding of P_{max} measurement uncertainties is expected to be useful in application of other IEC documents, such as IEC 61215-1 and IEC 62941, where P_{max} tolerances and uncertainties must be determined. Whenever possible, this document references specific IEC documents covering topics in more detail. Where no such documents exist, this document provides guidance and recommendations based on other publications relevant to the PV industry.

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 60512-2-1, *Connectors for electronic equipment – Tests and measurements – Part 2-1: Electrical continuity and contact resistance tests – Test 2a: Contact resistance – Millivolt level method*

IEC 60891, *Photovoltaic devices – Procedures for temperature and irradiance corrections to measured I-V characteristics*

IEC 60904-1:2020, *Photovoltaic devices – Part 1: Measurement of photovoltaic current-voltage characteristics*

IEC 60904-2:2015, *Photovoltaic devices – Part 2: Requirements for photovoltaic reference devices*

IEC 60904-3:2019, *Photovoltaic devices – Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data*

currently in preview, click buy full version