



SLOVENSKI STANDARD
SIST EN 61829:2016

01-april-2016

Nadomešča:
SIST EN 61829:2001

Fotonapetostno polje iz kristalnega silicija – Merjenje karakteristike I-U na mestu vgradnje

Crystalline silicon photovoltaic (PV) array - On-site measurement of I-V characteristics

iTeh STANDARD PREVIEW

Champ de modules photovoltaïques (PV) au silicium cristallin - Mesure sur site des caractéristiques I-V

[SIST EN 61829:2016](https://standards.iteh.ai/catalog/standards/sist/675da42e-d40b-4a27-91d5-22225b03/EN-61829-2016)

<https://standards.iteh.ai/catalog/standards/sist/675da42e-d40b-4a27-91d5-22225b03/EN-61829-2016>

Ta slovenski standard je istoveten z: EN 61829:2016

ICS:

27.160

Sončna energija

Solar energy engineering

SIST EN 61829:2016

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 61829:2016

<https://standards.iteh.ai/catalog/standards/sist/675da42e-d40b-4a27-91d5-251727625b03/sist-en-61829-2016>

EUROPEAN STANDARD

EN 61829

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2016

ICS 27.160

Supersedes EN 61829:1998

English Version

Photovoltaic (PV) array - On-site measurement of current-voltage characteristics (IEC 61829:2015)

Champ de modules photovoltaïques (PV) - Mesurage sur site des caractéristiques courant-tension
(IEC 61829:2015)

Photovoltaische (PV) Modulgruppen - Messen der Strom-/Spannungskennlinien am Einsatzort
(IEC 61829:2015)

This European Standard was approved by CENELEC on 2015-11-26. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

EN 61829:2016**European foreword**

The text of document 82/1008/FDIS, future edition 2 of IEC 61829, prepared by IEC/TC 82 "Solar photovoltaic energy systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61829:2016.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2016-08-26
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2019-02-26

This document supersedes EN 61829:1998.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 61829:2015 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60904-5	NOTE	Harmonized as EN 60904-5.
IEC 61853-1:2011	NOTE	Harmonized as EN 61853-1:2011 (not modified).
ISO/IEC 17025	NOTE	Harmonized as EN ISO/IEC 17025.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60891	-	Photovoltaic devices - Procedures for temperature and irradiance corrections to measured I-V characteristics	EN 60891	-
IEC 60904-1	-	Photovoltaic devices - Part 1: Measurement of photovoltaic current-voltage characteristics	EN 60904-1	-
IEC 60904-2	-	Photovoltaic devices - Part 2: Requirements for photovoltaic reference devices	EN 60904-2	-
IEC 60904-3	-	Photovoltaic devices - Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data	EN 60904-3	-
IEC 60904-4	-	Photovoltaic devices - Part 4: Reference solar devices - Procedures for establishing calibration traceability	EN 60904-4	-
IEC 60904-7	-	Photovoltaic devices - Part 7: Computation of the spectral mismatch correction for measurements of photovoltaic devices	EN 60904-7	-
IEC 60904-10	-	Photovoltaic devices - Part 10: Methods of linearity measurement	EN 60904-10	-

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 61829:2016

<https://standards.iteh.ai/catalog/standards/sist/675da42e-d40b-4a27-91d5-251727625b03/sist-en-61829-2016>



IEC 61829

Edition 2.0 2015-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Photovoltaic (PV) array – On-site measurement of current-voltage characteristics

Champ de modules photovoltaïques (PV) – Mesurage sur site des caractéristiques
courant-tension

[SIST EN 61829:2016](https://standards.iteh.ai/catalog/standards/sist/675da42e-d40b-4a27-91d5-251727625b03/sist-en-61829-2016)

<https://standards.iteh.ai/catalog/standards/sist/675da42e-d40b-4a27-91d5-251727625b03/sist-en-61829-2016>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 27.160

ISBN 978-2-8322-2966-8

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	7
4 Apparatus.....	7
4.1 Irradiance measurements in natural sunlight.....	7
4.2 Module temperature measurements	8
4.3 Electrical measurements	8
5 Measurement procedure	9
5.1 Choose and record appropriate conditions for measurement.....	9
5.2 Clean the modules	9
5.3 Check for shading.....	9
5.4 Confirm uniformity of irradiance over the test array	10
5.5 Mount the reference device.....	10
5.6 Prepare to measure the array temperature.....	10
5.7 Disconnect the array.....	11
5.8 Connect the measurement system to the array to be measured	11
5.9 Record electrical data and measurement conditions	11
5.10 Record spectral data.....	12
5.11 Typical and extreme module selection.....	12
6 Analysis.....	13
6.1 Adjust the measured irradiance for any deviation from reference conditions.....	13
6.2 Compute the average temperature of the array under test.....	13
6.3 Compute the junction temperature	14
6.4 Translate the measurement to the desired test condition.....	14
6.5 Correct for soiling losses	14
7 Test report.....	14
Annex A (informative) Reference values and reference device.....	16
A.1 Reference test conditions (RTC)	16
A.2 Standard test conditions (STC)	16
A.3 Reference device	16
Bibliography.....	17
Figure 1 – Examples of extreme and central modules	13

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**PHOTOVOLTAIC (PV) ARRAY –
ON-SITE MEASUREMENT OF CURRENT-VOLTAGE CHARACTERISTICS**

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.

International Standard IEC 61829 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

This second edition cancels and replaces the first edition published in 1995. This edition constitutes a technical revision.

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

- a) it addresses many outdated procedures;
- b) it accommodates commonly used commercial I - V curve tracers;
- c) it provides a more practical approach for addressing field uncertainties;
- d) it removes and replaces procedures with references to other updated and pertinent standards, including the IEC 60904 series, and IEC 60891.

The result is a much more practical and useful standard.

The text of this standard is based on the following documents:

FDIS	Report on voting
82/1008/FDIS	82/1041/RVD

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

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

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

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

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 61829:2016](#)

<https://standards.iteh.ai/catalog/standards/sist/675da42e-d40b-4a27-91d5-251727625b03/sist-en-61829-2016>

INTRODUCTION

The performance of photovoltaic (PV) systems over their decades-long life time is determined by comparing measured power production with the expected production as estimated from recorded weather conditions. Continuous measurements of system- or subsystem-level operating output can detect underperforming arrays but are not well suited for tracking degradation with any accuracy, or for identifying the weaknesses or failure modes that may exist within the array. Field I - V curve measurements offer a practical method of *in situ* benchmarking or troubleshooting for modules, strings and arrays. This International Standard specifies methods and approaches for field I - V curve measurements and calculations, and includes guidance for addressing the uncertainties associated with measurement devices and array configurations. Consistent and proper application of I - V curve measurement procedures helps to ensure that a PV system's performance is adequately characterized over time.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 61829:2016](https://standards.iteh.ai/catalog/standards/sist/675da42e-d40b-4a27-91d5-251727625b03/sist-en-61829-2016)

<https://standards.iteh.ai/catalog/standards/sist/675da42e-d40b-4a27-91d5-251727625b03/sist-en-61829-2016>