



SLOVENSKI STANDARD SIST EN 61724:2001

01-september-2001

Spremljanje zmogljivosti fotonapetostnega sistema – Smernice za merjenje, izmenjavo podatkov in analizo

Photovoltaic system performance monitoring - Guidelines for measurement, data exchange and analysis

Überwachung des Betriebsverhaltens photovoltaischer Systeme - Leitfaden für Messen, Datenaustausch und Analyse

Surveillance des qualités de fonctionnement des systèmes photovoltaïques - Recommandations pour la mesure, le transfert et l'analyse des données

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27.160 Solar energy engineering

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 61724

August 1998

ICS 27.180

English version

**Photovoltaic system performance monitoring
Guidelines for measurement, data exchange and analysis
(IEC 61724:1998)**

Suivi des performances des systèmes
photovoltaïques - Recommandations
pour les mesures, et le transfert et
l'analyse des données
(CEI 61724:1998)

Überwachung des Betriebsverhaltens
photovoltaischer Systeme - Leitfaden für
Messen, Datenaustausch und Analyse
(IEC 61724:1998)

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This European Standard was approved by CENELEC on 1998-08-01. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 82/189/FDIS, future edition 1 of IEC 61724, prepared by IEC TC 82, Solar photovoltaic energy systems, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61724 on 1998-08-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1999-05-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2001-05-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex ZA is normative and annex A is informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61724:1998 was approved by CENELEC as a European Standard without any modification.

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Annex ZA (normative)

Normative references to international publications
with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE: When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60904-2	1989	Photovoltaic devices	EN 60904-2	1993
A1	1998	Part 2: Requirements for reference solar cells	A1	1998
IEC 60904-6	1994	Part 6: Requirements for reference solar modules	EN 60904-6	1994
A1	1998		A1	1998
IEC 61194 (mod)	1992	Characteristic parameters of stand-alone photovoltaic (PV) systems	EN 61194	1995
IEC 61829	1995	Crystalline silicon photovoltaic (PV) array On-site measurement of I-V characteristics	EN 61829	1998

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1998-04

Surveillance des qualités de fonctionnement
des systèmes photovoltaïques –
Recommandations pour la mesure,
le transfert et l'analyse des données

iTeh STANDARD PREVIEW

Photovoltaic system performance monitoring –
Guidelines for measurement,
data exchange and analysis

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**PHOTOVOLTAIC SYSTEM PERFORMANCE MONITORING –
GUIDELINES FOR MEASUREMENT,
DATA EXCHANGE AND ANALYSIS**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61724 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

This bilingual version (1998-04) replaces the English version.

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

FDIS	Report on voting
82/189/FDIS	82/201/RVD

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

Annex A is for information only.

INTRODUCTION

This standard describes general guidelines for the monitoring and analysis of the electrical performance of photovoltaic (PV) systems. It does not describe the performance of discrete components, but concentrates on evaluating the performance of an array as part of a PV system.

The intent of the data analysis is to provide a performance summary suitable for comparing PV installations of different sizes, operating in different climates, and providing energy for different uses, in such a way that the relative merits of different designs or operating procedures become evident. Simpler methods might be more cost effective for small, solar home or domestic stand-alone systems.

Guidelines are also included which describe a file format to be used for the exchange of monitoring data between organizations.

The use of a microprocessor-based data acquisition system for monitoring is required.

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PHOTOVOLTAIC SYSTEM PERFORMANCE MONITORING – GUIDELINES FOR MEASUREMENT, DATA EXCHANGE AND ANALYSIS

1 Scope

This International Standard recommends procedures for the monitoring of energy-related PV system characteristics such as in-plane irradiance, array output, storage input and output and power conditioner input and output; and for the exchange and analysis of monitored data. The purpose of these procedures is to assess the overall performance of PV systems configured as stand-alone or utility grid-connected, or as hybridised with non-PV power sources such as engine generators and wind turbines.

This standard may not be applicable to small stand-alone systems due to the relatively high cost of the measurement equipment.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60904-2:1989, *Photovoltaic devices – Part 2: Requirements for reference solar cells*
Amendment 1 (1998)

IEC 60904-6:1994, *Photovoltaic devices – Part 6: Requirements for reference solar modules*
Amendment 1 (1998)

IEC 61194:1992, *Characteristic parameters of stand-alone photovoltaic (PV) systems*

IEC 61829:1995, *Crystalline silicon photovoltaic (PV) array – On-site measurement of I-V characteristics*

3 Measured parameters

Parameters to be measured are shown in table 1 and figure 1. Other parameters can be calculated from the measured data in real time by the data acquisition system's software. Note that all blocks in figure 1 can represent multiple components. The measured parameters and array characteristics are defined in IEC 61194.

The parasitic power drawn by all ancillary systems shall be considered a power loss of the PV plant and shall not be considered a load. All monitoring systems not essential for the operation of the PV plant shall be considered part of the load. The monitoring equipment may present a major part of the overall power consumption, and the end user should be made aware that supplemental power may be required to satisfy the total load requirement.