# INTERNATIONAL STANDARD

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# Photovoltaic systems – Power conditioners – Procedure for measuring efficiency

*Systèmes photovoltaïques – Conditionneurs de puissance – Procédure de mesure du rendement*

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# CONTENTS

Page

FOREWORD ..... 3
INTRODUCTION ..... 4

Clause

1 Scope ..... 5
2 Normative reference ..... 5
3 Definitions ..... 5
4 Efficiency measurement conditions ..... 6
4.1 DC power source for testing ..... 6
4.2 Temperature ..... 6
4.3 Output voltage and frequency ..... 6
4.4 Input voltage ..... 7
4.5 Ripple and distortion ..... 7
4.6 Resistive loads/utility grid ..... 7
4.7 Reactive loads ..... 7
4.8 Resistive plus non-linear loads ..... 8
4.9 Complex loads ..... 8
5 Efficiency calculations ..... 8
5.1 Rated output efficiency ..... 8
5.2 Partial output efficiency ..... 8
5.3 Energy efficiency ..... 9
5.4 Efficiency tolerances ..... 9
6 Efficiency test circuits ..... 9
6.1 Test circuits ..... 9
6.2 Measurement procedure ..... 10
7 Loss measurement ..... 10
7.1 No-load loss ..... 10
7.2 Standby loss ..... 11

Annex A (informative) Power conditioner description ..... 12
Annex B (informative) Power efficiency and conversion factor ..... 14
Annex C (informative) Weighted-average energy efficiency ..... 16
Annex D (informative) Derivation of efficiency tolerance in table 2 ..... 19
Bibliography ..... 20

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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# PHOTOVOLTAIC SYSTEMS – POWER CONDITIONERS – PROCEDURE FOR MEASURING EFFICIENCY

## FOREWORD

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International Standard IEC 61683 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

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

| FDIS | Report on voting |
|---|---|
| 82/229/FDIS | 82/233/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 3.

Annexes A, B, C and D are for information only.

A bilingual version of this standard may be issued at a later date.

The committee has decided that this publication remains valid until 2003. At this date, in accordance with the committee's decision, the publication will be

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- withdrawn;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

# INTRODUCTION

Among the principal characteristics of power conditioners, efficiency is considered as an important factor. A standardized procedure for measuring the efficiency of power conditioners is necessary for their widespread use in photovoltaic systems by increasing the reliability of their claimed efficiency.

Generally speaking, power conditioner efficiency is affected by the following parameters:

– power level;
– input voltage;
– output voltage;
– power factor;
– harmonic content;
– load non-linearity;
– temperature.

These parameters are considered to be included in the test condition of this standard explicitly or implicitly.

The purpose of this standard is to provide the means to evaluate the intrinsic efficiency of power conditioners by a direct measurement of input and output power in the factory. Therefore, indirect items such as maximum power-point tracking accuracy are outside the scope of this document. It is expected that those will be dealt with in future relevant IEC standard(s).

# PHOTOVOLTAIC SYSTEMS – POWER CONDITIONERS – PROCEDURE FOR MEASURING EFFICIENCY

## 1 Scope

This standard describes guidelines for measuring the efficiency of power conditioners used in stand-alone and utility-interactive photovoltaic systems, where the output of the power conditioner is a stable a.c. voltage of constant frequency or a stable d.c. voltage. The efficiency is calculated from a direct measurement of input and output power in the factory. An isolation transformer is included where it is applicable.

## 2 Normative reference

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, 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. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60146-1-1:1991, S*emiconductor convertors – General requirements and line commutated convertors – Part 1-1: Specifications of basic requirements*