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Safety of power converters for use in photovoltaic power systems - Part 3: Particular requirements for electronic devices in combination with photovoltaic elements

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 62109-3:2022 sisaldab Euroopa standardi EN IEC 62109-3:2022 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 62109-3:2022 consists of the English text of the European standard EN IEC 62109-3:2022.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 21.10.2022.	Date of Availability of the European standard is 21.10.2022.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

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EUROPEAN STANDARD

NORME EUROPÉENNE

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English Version

Safety of power converters for use in photovoltaic power systems - Part 3: Particular requirements for electronic devices in combination with photovoltaic elements (IEC 62109-3:2020)

Sécurité des convertisseurs de puissance utilisés dans les systèmes photovoltaïques - Partie 3: Exigences particulières pour les dispositifs électroniques combinés aux éléments photovoltaïques
(IEC 62109-3:2020)

Sicherheit von Leistungsumrichtern zur Anwendung in photovoltaischen Energiesystemen - Teil 3: Besondere Anforderungen an elektronische Geräte in Kombination mit Photovoltaikelementen
(IEC 62109-3:2020)

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

The text of document 82/1718/FDIS, future edition 1 of IEC 62109-3, prepared by IEC/TC 82 "Solar photovoltaic energy systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62109-3:2022.

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) 2023-06-14
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2025-09-14

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The text of the International Standard IEC 62109-3:2020 was approved by CENELEC as a European Standard without any modification.

IEC 62109-3

Edition 1.0 2020-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Safety of power converters for use in photovoltaic power systems – Part 3: Particular requirements for electronic devices in combination with photovoltaic elements

Sécurité des convertisseurs de puissance utilisés dans les systèmes photovoltaïques – Partie 3: Exigences particulières pour les dispositifs électroniques combinés aux éléments photovoltaïques

IEC 62109-3:2020-07(en-fr)

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IEC 62109-3

Edition 1.0 2020-07

INTERNATIONAL STANDARD

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colour inside

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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SAFETY OF POWER CONVERTERS FOR USE IN PHOTOVOLTAIC POWER SYSTEMS –

Part 3: Particular requirements for electronic devices in combination with photovoltaic elements

FOREWORD

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International Standard IEC 62109-3 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
82/1718/FDIS	82/1737/RVD

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

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

A list of all parts of IEC 62109 series, under the general title, *Safety of power converters for use in photovoltaic power systems*, can be found on the IEC website.

The requirements in this document IEC 62109-3 are to be used with the requirements in IEC 62109-1:2010 and IEC 62109-2:2011. This document IEC 62109-3 supplements or modifies clauses in IEC 62109-1:2010 and IEC 62109-2:2011. When a particular clause or subclause of IEC 62109-1:2010 or IEC 62109-2:2011 is not mentioned in this document IEC 62109-3, that clause of IEC 62109-1:2010 and/or IEC 62109-2:2011 applies. When this document IEC 62109-3 contains clauses that add to, modify, or replace clauses in IEC 62109-1:2010 or IEC 62109-2:2011, the relevant text of IEC 62109-1:2010 and IEC 62109-2:2011 is to be applied with the required changes.

Subclauses, figures and tables additional to those in IEC 62109-1:2010 and IEC 62109-2:2011 are numbered starting from 300 to indicate that they are introduced in this document IEC 62109-3.

NOTE For example, new level 2 subclauses in clause 5 would be numbered 5.300, 5.301, etc. New level 4 subclauses in subclause 7.3.201 would be numbered 7.3.201.300, 7.3.201.301, etc.

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.

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INTRODUCTION

This part 3 of IEC 62109 gives requirements for products which consist of an electronic element and a PV element or PV module. For this type of equipment, specific safety aspects must be considered that arise from the combination of these two product types. This part 3 gives safety requirements by: referring to other parts of IEC 62109 and to PV module standards like IEC 61730, defining tests and requirements that are in addition to these product standards of the sub elements, defining modifications to the test procedures in IEC 62109 and IEC 61730, and providing guidance to apply these tests to the combination of PV module and electronics.

SAFETY OF POWER CONVERTERS FOR USE IN PHOTOVOLTAIC POWER SYSTEMS –

Part 3: Particular requirements for electronic devices in combination with photovoltaic elements

1 Scope

This Part 3 of IEC 62109 covers the particular safety requirements for electronic elements that are mechanically and/or electrically incorporated with photovoltaic (PV) modules or systems.

Mechanically and/or electrically incorporated means that the whole combination of electronic device with the photovoltaic element is sold as one product. Nevertheless, tests provided in this document may also be used to evaluate compatibility of PV modules and electronic devices that are sold separately and are intended to be installed close to each other.

Items included in the scope:

Electronic devices combined with PV modules that perform functions such as, but not limited to, DC-DC or DC-AC power conversion, active diodes, protection, control, monitoring, or communication. These requirements specifically address such electronic devices used in combination with flat-plate photovoltaic (PV) modules.

NOTE It is acknowledged that the physical design of products covered by this scope may vary widely, it is anticipated that the requirements of this document may need to evolve to meet the unique safety requirements of such products, particularly if the photovoltaic element of the product is not of a flat-plate configuration. As an example, this document does not fully address the safety requirements of building-integrated photovoltaics (BIPV) and building-attached photovoltaics (BAPV) products, although they would fall under the scope of this document.

The purpose of the requirements of this part of IEC 62109 is to provide additional safety-related testing requirements for the following types of integrated electronics, collectively referred to as module integrated equipment (MIE):

a) Type A MIE where the PV element can be evaluated as a PV module according to IEC 61730-1 and IEC 61730-2 independently from the electronic element;
b) Type B MIE where the PV element cannot be evaluated as a PV module according to IEC 61730-1 and IEC 61730-2 independently from the electronic element.

Items excluded from the scope:

PV modules with only one or more bypass diodes as the combined or integrated element. Such products are covered by IEC 61730-1 and IEC 61730-2.

Aspects included and excluded from scope:

All aspects of IEC 62109-1:2010 apply. Addition to the list “excluded from the scope” is evaluating the MIE to IEC 61215-1.

2 Normative references

Clause 2 of IEC 62109-1:2010 and IEC 62109-2:2011 is applicable with the following additions:

IEC 61215-2:2016, *Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 2: Test procedures*

IEC 61730-1:2016, *Photovoltaic module safety qualification – Part 1: Requirements for construction*

IEC 61730-2:2016, *Photovoltaic (PV) module safety qualification – Part 2: Requirements for testing*

IEC 61853-2:2016, *Photovoltaic (PV) module performance testing and energy rating – Part 2: Spectral responsivity, incidence angle and module operating temperature measurements*

IEC 62109-1:2010, *Safety of power converters for use in photovoltaic power systems – Part 1: General requirements*

IEC 62109-2:2011, *Safety of power converters for use in photovoltaic power systems – Part 2: Particular requirements for inverters*

IEC 62790:2014, *Junction boxes for photovoltaic modules – Safety requirements and tests*

3 Terms and definitions

Clause 3of IEC 62109-1:2010 and IEC 62109-2:2011 is applicable with the following modifications:

Modification:

In all cases where the term “PCE” is used in a definition in Clause 3 of IEC 62109-1:2010 or IEC 62109-2:2011, it is replaced in this part with the term “MIE”, except for 3.66.

3.39
Isc PV
Modification:

Replace “array” *with* “PV element”.

3.58
Pluggable equipment type B

Modify Note:

Note 1 to entry: MIE PV AC and DC circuits that use connectors are considered pluggable equipment type B MIE and may also be considered fixed equipment.

3.97
Vmax PV

Modification:

Replace “array” *with* “PV element”.

Additional subclauses:

3.300
module integrated equipment
MIE
minimally, the complete combination of photovoltaic elements, electronic devices, wiring with connector(s), and mechanical mounting means

Note 1 to entry: This document uses two designations for MIE only for the purpose of describing test methods and what tests apply: Type A MIE and Type B MIE. These type designations have no meaning outside of this document.