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GENEREERIMISSÜSTEEMID. TOITEMUUNDURSEADMETE
ELEKTROMAGNETILISE ÜHILDUVUSE NÕUDED JA
KATSETUSMEETODID**

**Photovoltaic power generating systems - EMC
requirements and test methods for power conversion
equipment
(IEC 62920:2017 + IEC 62920:2017/A1:2021)**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 62920:2017+A11+A1:2021 sisaldab Euroopa standardi EN 62920:2017 ja selle muudatuste A11:2020 ja A1:2021, ingliskeelset teksti.	This Estonian standard EVS-EN 62920:2017+A11+A1:2021 consists of the English text of the European standard EN 62920:2017 and its amendments A11:2020 and A1:2021.
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English Version

**Photovoltaic power generating systems - EMC requirements and
test methods for power conversion equipment
(IEC 62920:2017 + IEC 62920:2017/A1:2021)**

Systèmes de production d'énergie photovoltaïque -
Exigences de CEM et méthodes d'essai pour les
équipements de conversion de puissance
(IEC 62920:2017 + IEC 62920:2017/A1:2021)

Photovoltaische Stromerzeugungssysteme - EMV-
Anforderungen und Prüfverfahren für Leistungsumrichter
(IEC 62920:2017 + IEC 62920:2017/A1:2021)

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European foreword

The text of document 82/1288/FDIS, future edition 1 of IEC 62920, prepared by IEC/TC 82 "Solar photovoltaic energy systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62920:2017.

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IEC 60364-1:2005	NOTE Harmonized as HD 60364-1:2008.
IEC 60974-10	NOTE Harmonized as EN 60974-10.
IEC 61000 (series)	NOTE Harmonized as EN 61000 (series).
IEC 61800-3	NOTE Harmonized as EN 61800-3.
IEC 61851-21-2 ¹⁾	NOTE Harmonized as FprEN 61851-21-2.
IEC 62040-2	NOTE Harmonized as EN 62040-2.

1) To be published. At draft stage.

A11 Amendment A11 European foreword

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For the relationship with EU Directive(s) and the standardization request see informative Annex ZZ, which is an integral part of this document. A11

A1 Amendment A1 European foreword

The text of document 82/1835/FDIS, future IEC 62920/A1, prepared by IEC/TC 82 "Solar photovoltaic energy systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62920:2017/A1:2021.

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IEC 62109-1:2010 NOTE Harmonized as EN 62109-1:2010 (not modified)

IEC 62933-1:2018 NOTE Harmonized as EN IEC 62933-1:2018 (not modified)

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Photovoltaic power generating systems – EMC requirements and test methods
for power conversion equipment**

**Systèmes de production d'énergie photovoltaïque – Exigences de CEM et
méthodes d'essai pour les équipements de conversion de puissance**



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INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Photovoltaic power generating systems – EMC requirements and test methods
for power conversion equipment**

**Systèmes de production d'énergie photovoltaïque – Exigences de CEM et
méthodes d'essai pour les équipements de conversion de puissance**

INTERNATIONAL
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

PHOTOVOLTAIC POWER GENERATING SYSTEMS – EMC REQUIREMENTS AND TEST METHODS FOR POWER CONVERSION EQUIPMENT

FOREWORD

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International Standard IEC 62920 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
82/1288/FDIS	82/1313/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.

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AMENDMENT A1 FOREWORD

This amendment has been prepared by the IEC technical committee 82: Solar photovoltaic energy systems.

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

FDIS	Report on voting
82/1835/FDIS	82/1874/RVD

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

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INTRODUCTION

A1) Background

Power conversion equipment (PCE) is indispensable for solar photovoltaic power energy systems in order to convert the DC electric power energy generated by solar photovoltaic panels into AC or DC electric power, and to feed the AC power energy into the AC mains network or loads. PCE consists of DC to DC, DC to AC or AC to DC converters and forms systems with or without DC-coupled electrical energy storage devices.

Manufacturers of PCE ensure the performance and reliability of PCE. Electromagnetic compatibility (EMC) is one aspect of performance which must be ensured wherever PCE is used in or exposed to an electromagnetic environment.

IEC Guide 107 specifies that TC 77 and CISPR, which are called EMC committees, have responsibility for the development of basic, product family and generic standards on EMC requirements, and product committees must use the emission limits developed by EMC committees and must refer to basic immunity standards for the specification of test techniques.

However, when the EMC standards which are developed by TC 77 and CISPR are not considered suitable for a particular product or electromagnetic environment, product committees must seek their assistance and advice for any change in the emission limits and/or measurement requirements. Product committees are responsible for selecting the appropriate immunity test items and levels for their products as well as for defining the relevant performance criteria for the evaluation of the immunity test results. Consequently, product committees, such as TC 22, TC 26, TC 9, and TC 69, have their own EMC standard to define EMC requirements and test methods for their particular types of products.

TC 82 also has the responsibility to consider EMC requirements for PCE applying to the solar photovoltaic power energy systems, and TC 82 has taken action as follows to develop its own product EMC standards:

- a) selection of the immunity test items in accordance with EMC environments for the solar photovoltaic power energy systems,
- b) supplement of generic standards with a detailed description of test conditions and test set up,
- c) development of the conditional limits and alternative test methods in terms of installation environmental and operational conditions, and
- d) development of appropriate requirements and test method for high power equipment.

In 2017, TC82 published IEC 62920 (Ed.1.0). By taking into account the latest market needs, IEC 62920:2017 (Ed.1.0) has covered the above mentioned items and presents the minimum EMC requirements for PCE applying to solar photovoltaic power energy systems.

Purpose of the maintenance of a product EMC standard

Following the state of the art technology as well as the latest market needs, users of standards recognize the improvement of product EMC standards. The maintenance of product standards is also one of important activities for product committees.

IEC 62920:2017 (Ed.1.0) is amended to extend the scope of IEC 62920:2017 (Ed.1.0) by taking into account the following technical items.

- DC to DC power conversion equipment used in photovoltaic power energy systems.
- Electrical energy storage devices connected to DC power ports of PCE used in photovoltaic power energy systems.

Furthermore, IEC 62920:2017 (Ed.1.0) is amended to cover the latest options of measurement distance of radiated disturbances by taking the latest updates of CISPR 16-1-4 and CISPR 16-2-3 into consideration to adapt it to different sizes of products. 

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PHOTOVOLTAIC POWER GENERATING SYSTEMS – EMC REQUIREMENTS AND TEST METHODS FOR POWER CONVERSION EQUIPMENT

1 Scope

A1 This document specifies electromagnetic compatibility (EMC) requirements for power conversion equipment (PCE) (e.g. DC to DC, DC to AC and AC to DC) for use in photovoltaic (PV) power systems with or without DC-coupled electrical energy storage devices. **A1**

The PCE covered by this document can be grid-interactive, which is termed as a grid connected power converter (GCPC), or stand-alone. It can be supplied by single or multiple photovoltaic modules grouped in various array configurations, and can be intended for use in conjunction with batteries or other forms of energy storage.

NOTE A micro inverter is an example of a GCPC supplied by a single photovoltaic module.

This document covers not only PCE connected to a public low voltage AC mains network or other low voltage AC mains installation, but also PCE connected to a medium or high voltage AC network with or without step-down power transformers. Requirements for the PCE connected to a medium or high voltage AC network are specified in this document. However, some requirements relevant to grid interconnection are addressed with other standards specifying power quality or their own grid codes in some countries.

NOTE DC/DC converters used for PV systems are not yet covered in this document. They can cause electromagnetic interference due to conducted disturbances at DC ports.

PCE is assessed with EMC requirements as a type test at a test site. This document provides test methods and test conditions for PCE as well as emission and immunity requirements, but not for photovoltaic modules and other balance of system components.

When compliance with EMC requirements at the test site cannot be shown due to technical reasons of the test site, PCE can be assessed in situ, such as at the manufacturer's premises or in the field where the PCE is assembled into a PV power system. However, only high frequency emission requirements for in situ assessment are specified in CISPR 11.

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 61000-3-2:2014, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment with input current ≤ 16 A per phase)*

IEC 61000-3-3:2013, *Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection*

IEC TR 61000-3-6:2008, *Electromagnetic compatibility (EMC) – Part 3-6: Limits – Assessment of emission limits for the connection of distorting installations to MV, HV and EHV power systems*

IEC 61000-3-11:2000, *Electromagnetic compatibility (EMC) – Part 3-11: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems – Equipment with rated current ≤ 75 A and subject to conditional connection*

IEC 61000-3-12:2011, *Electromagnetic compatibility (EMC) – Part 3-12: Limits – Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase*

IEC TR 61000-3-14:2011, *Electromagnetic compatibility (EMC) – Part 3-14: Assessment of emission limits for harmonics, interharmonics, voltage fluctuations and unbalance for the connection of disturbing installations to LV power systems*

IEC 61000-4-2:2008, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3:2006, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-3:2006/AMD1:2007

IEC 61000-4-3:2006/AMD2:2010

IEC 61000-4-4:2012, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5:2014, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6:2013, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-7:2002, *Electromagnetic compatibility (EMC) – Part 4-7: Testing and measurement techniques – General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto*

IEC 61000-4-7:2002/AMD1:2008

IEC 61000-4-11:2004, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

IEC 61000-4-34:2005, *Electromagnetic compatibility (EMC) – Part 4-34: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current more than 16 A per phase*

CISPR 11:2015, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*

CISPR 11:2015/AMD1:2016

CISPR 16-1-2:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-2: Radio disturbance and immunity measuring apparatus – Coupling devices for conducted disturbance measurements*

CISPR 32:2015, *Electromagnetic compatibility of multimedia equipment – Emission requirements*