SLOVENSKI STANDARD
SIST EN IEC 61439-8:2026

01-junij-2026

Sestavi nizkonapetostnih stikalnih in krmilnih naprav - 8. del: Sestavi za uporabo v fotonapetostnih inštalacijah (IEC 61439-8:2026)

Low-voltage switchgear and controlgear assemblies - Part 8: Assemblies for use in photovoltaic installations (IEC 61439-8:2026)

Niederspannungs-Schaltgerätekombinationen – Teil 8: Schaltgerätekombinationen für den Einsatz in Photovoltaik-Anlagen (IEC 61439-8:2026)

Ensembles d'appareillage à basse tension - Partie 8: Ensembles destinés aux installations photovoltaïques (IEC 61439-8:2026)

Ta slovenski standard je istoveten z: **EN IEC 61439-8:2026**

ICS:

27.160	Sončna energija	Solar energy engineering
29.130.20	Nizkonapetostne stikalne in krmilne naprave	Low voltage switchgear and controlgear

SIST EN IEC 61439-8:2026 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 61439-8

April 2026

ICS 29.130.20

English Version

Low-voltage switchgear and controlgear assemblies - Part 8: Assemblies for use in photovoltaic installations (IEC 61439-8:2026)

Ensembles d'appareillage à basse tension - Partie 8: Ensembles destinés aux installations photovoltaïques (IEC 61439-8:2026)

Niederspannungs-Schaltgerätekombinationen - Teil 8: Schaltgerätekombinationen für den Einsatz in Photovoltaik-Anlagen (IEC 61439-8:2026)

This European Standard was approved by CENELEC on 2026-04-17. 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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

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

Ref. No. EN IEC 61439-8:2026 E

European foreword

The text of document 121B/224/FDIS, future edition 1 of IEC 61439-8, prepared by SC 121B "Low-voltage switchgear and controlgear assemblies" of IEC/TC 121 "Switchgear and controlgear and their assemblies for low voltage" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61439-8:2026.

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) 2027-04-30
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2029-04-30

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

This document is read in conjunction with EN IEC 61439-1:2021.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 61439-8:2026 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 standard indicated:

IEC 60269 (series)	NOTE	Approved as EN IEC 60269 (series)
IEC 60898 (series)	NOTE	Approved as EN IEC 60898-3:2025/A1 (series)
IEC 60947 (series)	NOTE	Approved as EN IEC 60947 (series)
IEC 61008 (series)	NOTE	Approved as EN 61008 (series)
IEC 61009 (series)	NOTE	Approved as EN 61009 (series)
IEC 61010-2-201	NOTE	Approved as EN IEC 61010-2-201
IEC 61427-1	NOTE	Approved as EN 61427-1
IEC 61439-2:2020	NOTE	Approved as EN IEC 61439-2:2021 (not modified)
IEC 61800-5-1	NOTE	Approved as EN IEC 61800-5-1
IEC 62093	NOTE	Approved as EN IEC 62093
IEC 62124	NOTE	Approved as EN 62124
IEC 62423	NOTE	Approved as EN 62423
IEC 62446 (series)	NOTE	Approved as EN IEC 62446 (series)
IEC 62446-1:2016	NOTE	Approved as EN 62446-1:2016 (not modified)
IEC 62790	NOTE	Approved as EN IEC 62790

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where 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.cencenelec.eu.

EN IEC 61439-1:2021, Clause 2, is applicable in addition to the following:

Addition:

Publication	Year	Title	EN/HD	Year
IEC 60068-2-14	-	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN IEC 60068-2-14	-
IEC 60269-6	-	Low-voltage fuses - Part 6: Supplementary requirements for fuse-links for the protection of solar photovoltaic energy systems	EN 60269-6	-
IEC 60364-7-712	-	Low-voltage electrical installations - Part 7-712: Requirements for special installations or locations - Solar photovoltaic (PV) power supply installations	-	-
IEC 60664-1	-	Insulation coordination for equipment within low-voltage supply systems - Part 1: Principles, requirements and tests	EN IEC 60664-1	-
IEC/TR 60890	-	A method of temperature-rise verification of low-voltage switchgear and controlgear assemblies by calculation	-	-
IEC 60898-2	-	Electrical accessories - Circuit-breakers for overcurrent protection for household and similar installations - Part 2: Circuit-breakers for AC and DC operation	EN 60898-2	-
IEC 60898-3	-	Electrical accessories - Circuit-breakers for overcurrent protection for household and similar installations - Part 3: Circuit-breakers for DC operation	EN IEC 60898-3	-
IEC 60947-2	2024	Low-voltage switchgear and controlgear - Part 2: Circuit-breakers	EN IEC 60947-2	2025
IEC 60947-3	2020	Low-voltage switchgear and controlgear - Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units	EN IEC 60947-3	2021

IEC 61439-1	2020	Low-voltage switchgear and controlgear assemblies - Part 1: General rules	EN IEC 61439-1	2021
IEC 62109	series	Safety of power converters for use in photovoltaic power systems - Part 1: General requirements	-	series
IEC 62262	2002	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)	EN 62262	2002
+ AMD	2021		+ A1	2021
IEC 63027	-	Photovoltaic power systems - DC arc detection and interruption	EN IEC 63027	-
IEC 63112	-	Photovoltaic (PV) arrays - Earth fault protection equipment - Safety and safety-related functionality	EN IEC 63112	-

IEC 61439-8

Edition 1.0 2026-03

INTERNATIONAL STANDARD

Low-voltage switchgear and controlgear assemblies -
Part 8: Assemblies for use in photovoltaic installations

ICS 29.130.20

ISBN 978-2-8327-1077-7

IEC 61439-8:2026-03(en)

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

Low-voltage switchgear and controlgear assemblies - Part 8: Assemblies for use in photovoltaic installations

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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.IEC.ch. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 61439-8 has been prepared by subcommittee 121B: Low-voltage switchgear and controlgear assemblies, of IEC technical committee 121: Switchgear and controlgear and their assemblies for low voltage. It is an International Standard.

This first edition will replace Annex DD, Annex EE and Annex FF from IEC 61439-2 edition 3 published in 2020 to create IEC 61439-8 as a standalone document. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous Annex DD in IEC 61439-2:2020:

a) the scope has been modified to further define the characteristics of PVA;
b) addition of several definitions of different type of boxes and other technical terms;
c) consideration of IP code according to the different applications of PVA;

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

Draft	Report on voting
121B/224/FDIS	121B/227/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.IEC.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.IEC.ch/publications.

A list of all parts of the IEC 61439 series, under the general title *Low-voltage switchgear and controlgear assemblies* can be found on the IEC website.

This document is to be read in conjunction with IEC 61439-1:2020. The provisions of the general rules dealt with in IEC 61439-1 are only applicable to this document insofar as they are specifically cited. When this document states "addition", "modification" or "replacement", the relevant text in IEC 61439-1 is to be adapted accordingly.

Subclauses that are numbered with a 101 (102, 103, etc.) suffix are additional to the same subclause in IEC 61439-1.

Tables and figures in this document that are new are numbered starting with 101.

Annexes in this document are lettered AA, BB, etc.

In this document, general terms and definitions are defined in Subclause 3.1.

In this document, the term Photovoltaic Assembly (PVA) is defined in 3.1.101.

NOTE Throughout the IEC 61439 series of standards, the term assembly (see IEC 61439-1:2020, 3.1.1) is used for a low-voltage switchgear and controlgear assembly.

The reader's attention is drawn to the fact that Annex EE lists all the "in-some-country" clauses on differing practices of a less permanent nature relating to the subject of this document.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.IEC.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,
– withdrawn, or
– revised.

INTRODUCTION

The photovoltaic technology enables electricity to be produced directly from sunlight, which is a source of renewable energy. Photovoltaic (PV) energy is one of the most promising technologies meeting the pressing need for green renewable energy and is a part of the answer to the challenge of sustainable development. Pushed by sustainable energy policies, extensive country engagement, technology development, and cost reduction, the number of photovoltaic (PV) installations according to IEC 60364-7-712 is increasing rapidly.

PV installations are usually split into two main categories:

– large scale-utility PV installations, where electricity production can be stored or exported to the grid.

– small PV installations, for example rooftop installation, where the produced energy can be consumed locally or exported to the grid.

PV applications have characteristics that require assemblies with specific performance. A typical arrangement of a PV installation is shown in Figure 101. Further examples are provided in Annex FF.

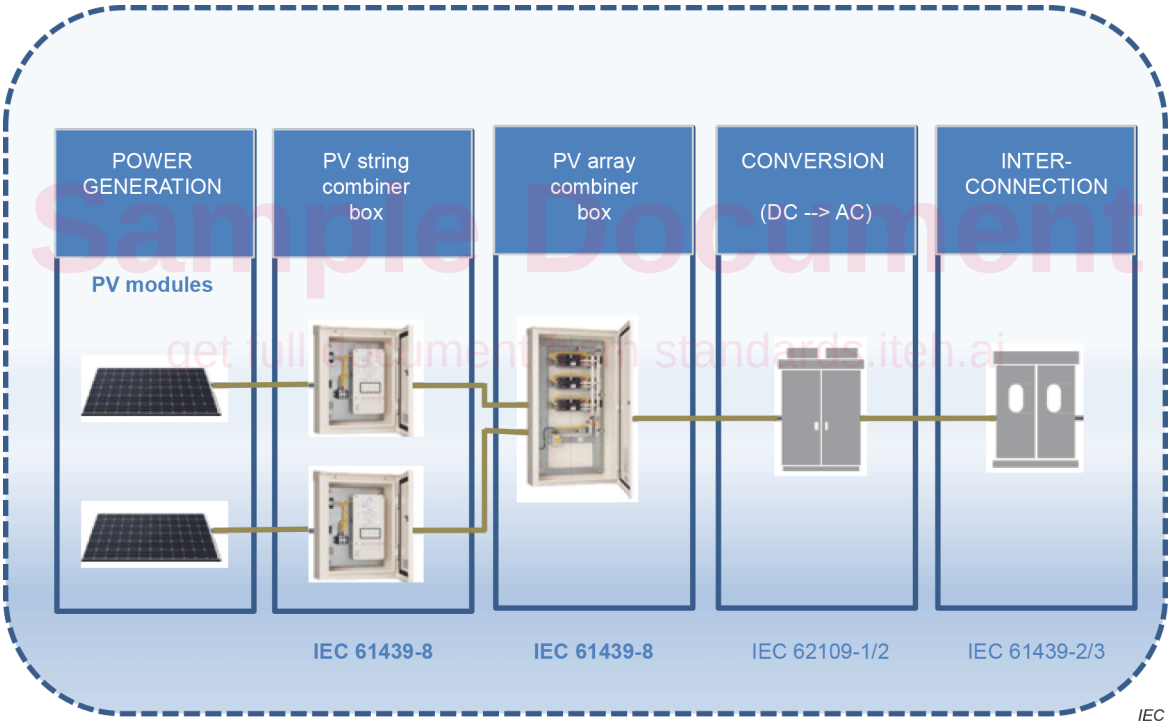

Figure 101 – Example of a large scale-utility PV installation

1 Scope

This part of the IEC 61439 series specifies requirements for the design and verification of low-voltage switchgear and controlgear assemblies for use in photovoltaic installations.

PVAs have the following characteristics:

– assemblies used for the combination of electrical energy in DC systems for which the input and output voltage does not exceed 1 500 V DC;

– assemblies supplied from an AC network where the voltage does not exceed 1 000 V AC for auxiliary and control purposes;

– stationary assemblies with an enclosure;

– assemblies intended for operation by authorised persons (see IEC 61439-1:2020, 3.7.17), but can be located in an area accessible to ordinary persons (see IEC 61439-1:2020, 3.7.16);

– suitable for indoor or outdoor installation.

NOTE 1 PV installations having PV modules with micro-inverters that are connected directly to inter-connection assemblies according to IEC 61439-2 or IEC 61439-3 are not covered by this document.

NOTE 2 Requirements for PVA including other types of DC distribution circuits, for example battery circuits, connected in the same assembly are under consideration.

This document identifies definitions, specifies the service conditions, details the construction requirements, defines the technical characteristics, and provides verifications for PVAs.

PVAs can also include control or signalling devices, or both, associated with the distribution of electrical energy.

This document applies to all PVAs whether they are designed and manufactured on a one-off basis or fully standardized and manufactured in quantity. Either the manufacture or assembly, or both, can be carried out by an entity other than the original manufacturer (see IEC 61439-1:2020, 3.10.1).

This document does not apply to:

– individual devices, for example, circuit-breakers, fuse switches and self-contained components such as, motor starters, switch mode power supplies (SMPS), uninterruptable power supplies (UPS), basic drive modules (BDM), complete drive modules (CDM), adjustable speed power drives systems (PDS), stand-alone energy storage systems (battery and capacitor systems), other electronic equipment which comply with their relevant product standards, such as junction boxes of photovoltaic modules. This document describes their integration into a PVA or an empty enclosure used as a part of a PVA;

– photovoltaic power conversion equipment (PCE) incorporating DC combination sub-systems, covered by the IEC 62109 series.

Some applications, such as either explosive atmospheres or functional safety, or both, can be subject to the requirements of other standards or local installation rules in addition to those specified in the IEC 61439 series.

This document does not apply to the specific types of assemblies covered by other parts of the IEC 61439 series.

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 61439-1:2020, Clause 2, is applicable in addition to the following:

Addition:

IEC 60068-2-14, *Environmental testing - Part 2-14: Tests - Test N: Change of temperature*

IEC 60269-6, *Low-voltage fuses - Part 6: Supplementary requirements for fuse-links for the protection of solar photovoltaic energy systems*

IEC 60364-7-712, *Low voltage electrical installations - Part 7-712: Requirements for special installations or locations - Solar photovoltaic (PV) power supply systems*

IEC 60664-1, *Insulation coordination for equipment within low-voltage supply systems - Part 1: Principles, requirements and tests*

IEC TR 60890, *A method of temperature-rise verification of low-voltage switchgear and controlgear assemblies by calculation*

IEC 60898-2, *Electrical accessories - Circuit-breakers for overcurrent protection for household and similar installations - Part 2: Circuit-breakers for AC and DC operation*

IEC 60898-3, *Electrical accessories - Circuit-breakers for overcurrent protection for household and similar installations - Part 3: Circuit-breakers for DC operation*

IEC 60947-2:2024, *Low-voltage switchgear and controlgear - Part 2: Circuit-breakers*

IEC 60947-3:2020, *Low-voltage switchgear and controlgear - Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units*

IEC 61439-1:2020, *Low-voltage switchgear and controlgear assemblies - Part 1: General rules*

IEC 62109 (all parts), *Safety of power converters for use in photovoltaic power systems*

IEC 62262:2002, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*
IEC 62262:2002/AMD1:2021

IEC 63027, *Photovoltaic power systems - DC arc detection and interruption*

IEC 63112, *Photovoltaic (PV) arrays - Earth fault protection equipment - Safety and safety related functionality*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61439-1 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

– IEC Electropedia: available at https://www.electropedia.org/

– ISO Online browsing platform: available at https://www.iso.org/obp

3.1 General terms

Additional terms and definitions:

3.1.101
photovoltaic assembly
PVA
assembly used in the DC part of a photovoltaic installation to receive electrical energy from one or more PV modules and distributes the energy through one or more outgoing circuits

3.1.102
PV string
circuit of one or more series-connected PV modules

3.1.103
photovoltaic string combiner box
PVA where photovoltaic strings are electrically connected, which can also contain either overcurrent protection or disconnection devices, or both

Note 1 to entry: The terms junction, connection and termination box have the same meaning.

3.1.104
photovoltaic array combiner box
PVA where photovoltaic sub-arrays or arrays are electrically connected, which can also contain either overcurrent protection or disconnection devices, or both

3.1.105
test situation
condition of a PVA or part of it in which the relevant main circuits are open on its supply side but not necessarily isolated whilst the associated auxiliary circuits are connected, allowing operational tests of the incorporated device(s)

3.1.106
form of internal separation
classification of physical separation within a PVA

3.1.107
solar irradiance
irradiance produced by solar radiation expressed in watt per square metre (W/m^2).