SLOVENSKI STANDARD
oSIST prEN IEC 62852:2026

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PV-spojke za enosmerne aplikacije v fotonapetostnih sistemih - Varnostne zahteve in preskusi

PV coupler for DC-application in photovoltaic systems - Safety requirements and tests

Steckverbinder für Gleichspannungsanwendungen in Photovoltaik-Systemen - Sicherheitsanforderungen und Prüfungen

Connecteurs pour applications en courant continu pour systèmes photovoltaïques - Exigences de sécurité et essais

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ICS:

27.160	Sončna energija	Solar energy engineering
31.220.10	Vtiči in vtičnice, konektorji	Plug-and-socket devices. Connectors

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82/2690/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 62852 ED2**	
DATE OF CIRCULATION: **2026-10-16**	CLOSING DATE FOR VOTING: **2027-01-08**
SUPERSEDES DOCUMENTS: **82/2575/CD, 82/2603A/CC**	

IEC TC 82 : SOLAR PHOTOVOLTAIC ENERGY SYSTEMS	
SECRETARIAT: United States of America	SECRETARY: Mr George Kelly
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 64	HORIZONTAL FUNCTION(S):
ASPECTS CONCERNED: Safety	
☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING
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TITLE:

PV coupler for DC-application in photovoltaic systems - Safety requirements and tests

PROPOSED STABILITY DATE: 2029

NOTE FROM TC/SC OFFICERS:

This project was discussed and supported by WG2 during their meeting in 2026-04.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

PV COUPLER FOR DC-APPLICATION IN PHOTOVOLTAIC SYSTEMS – SAFETY REQUIREMENTS AND TESTS

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

Draft	Report on voting
82/XX/FDIS	82/XX/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/standardsdev/publications.

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This edition included the following significant technical changes with respect to the previous edition.

1) Replacement of the term “connectors” with “PV coupler” in title and in text where it is applicable.

2) Addition in the scope of the statement that this standard only applies for PV couplers consisting of connectors from same manufacturer and from the same product family.

3) New definitions added and improvement of existing definitions. Some definitions have also been categorized.

4) “Factory assembled connectors” and “Field assembled connectors” have been added as new characteristics in 4.3.

5) For operation in higher ambient temperatures the reference to IEC TS 63126 has been added.

6) Beside the change in headline of section 5.2 (Identification, marking and documentation), “maximum rated altitude” and “number of operating cycles” have been added in the list for identification or characterization in 5.2.1 (Identification).

7) In 5.2.3 (Documentation) additional requirements for the content of documentation have been listed.

8) Three subclauses for have been added for special information (5.2.4), design requirements (5.7.5) and assembly of specimen (6.2.5) for field assembled connectors.

9) Clause 5.3 has been divided in two subclauses for a better explanation of correct mating of multi-way connectors (5.3.1) and non-intermateability (5.3.2).

10) Clause 5.4.1 has been improved such that it is now clearer, that the connector has to be mounted to the cable and has to be fully engaged to be tested.

11) The protection against electric shock described in 5.4.2 shall be ensured also before mating both parts of the connector. Verification shall be provided by application of test probe B instead of test probe 11 of IEC 61032

12) Supplement of two methods (ultrasonic welding and compression) for termination of the conductors to the connector

13) In subclause 5.7.3 it is now clarified which types of cable according to IEC 62930 can be applied. It is stated that cables according to EN 50618 can be used as an alternative for cables Type 131 IEC 62930. Also, a hint is given that wires connected to built-in

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plugs are only subject to the conditions of the respective device in which they are installed.

14) New requirement added in 5.7.6 that manufacturer shall be able to provide suitable environmental protection. Reference to new informative annex C.

15) The subclauses 5.18.3.2 “Pollution degree”, and 5.18.3.3 “Comparative tracking index” were moved to annex B. References for explanation and evaluation of isolation coordination to Annex B have been added.

16) The duration of weather resistance test in 5.19.2 has been extended from 500h to 1000h.

17) The values for RTE/RTI or TI of insulation material of outer accessible parts (5.19.2) and inner parts (5.19.3) shall have a minimum value of 90°C and shall have at least the same value as for ULT.

18) A clause (5.19.4) for requirements for gaskets and seals as well as a clause for the relevant tests (6.3.17) have been added.

19) In a few subclauses of 6.3 of Edition 1.0 the pass/fail criteria haven’t been listed; they only occur in the Tables 7 to 13. In this edition pass/fail criteria as well as the remark to proceed with the tests in the relevant test groups have been added in 6.3.4 (Temperature rise), 6.3.5 (Mechanical operation), 6.3.9 (Corrosion test), 6.3.11 (Change of temperature), and 6.3.12 (Damp heat test).

20) Figure 1 in 6.3.6 has been changed according to 24.4 of IEC 60309-1:2021

21) To avoid misunderstandings a clause (6.3.16) to describe the “Measurement of contact resistance” has been added.

22) Annex B does now contain much more detailed description and explanation for determination and measurement of clearances and creepage distances. (12 pages instead of formerly 4 pages)

23) Informative Annex C has been added to give guidance for protection caps used for unmated connector parts.

24) Informative Annex D has been added to explain the application of the term PV coupler instead of connector.

25) Informative Annex E has been added with recommendations for verification of crimped connections.

26) More detailed information about preparation of specimen for tests in test laboratories added.

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PV COUPLER FOR DC-APPLICATION IN PHOTOVOLTAIC (PV) SYSTEMS – SAFETY REQUIREMENTS AND TESTS

1

1 Scope

This International Standard applies to PV couplers for use in the d.c. circuits of photovoltaic systems according to IEC 60364-7-712 and PV arrays according to IEC 62548-1, categorized as class II of IEC 61140 with rated voltages up to 1 500 V d.c. and rated currents up to 125 A per contact.

This standard applies to PV couplers consisting of connectors from same product family of same manufacturer without breaking capacity, but which are able to be engaged and disengaged under voltage (i.e. when live, Connector under voltage (CuV)).

Note 1 to entry: The meaning of “manufacturer” is described in 3.3.

This standard also applies to connectors for PV couplers which are intended to be built-in or integrated in enclosures of devices for photovoltaic systems. This standard may be used as a guide for PV couplers in photovoltaic systems of classes 0 and III according to IEC 61140. This document does not apply to connectors for data collection, tracker controls or similar, but it may be used as a guide for those connectors.

This standard does not cover any requirement which may be applied for tests of combinations of plugs and sockets from different manufacturers.

Note 2 to entry: IEC 63678, Standardized plug and socket design for DC photovoltaic (PV) systems for intermatability of connectors from different manufacturers is in development.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050 (all parts): *International Electrotechnical Vocabulary (available at http://www.electropedia.org)*

IEC 60060-1, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60068-1, *Environmental testing – Part 1: General and guidance*

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

IEC 60068-2-75, *Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests*

IEC 60068-2-78, *Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state*

IEC 60112, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60216-1, *Electrical insulating materials – Thermal endurance properties – Part 1: Ageing procedures and evaluation of test results*

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IEC 60216-5, *Electrical insulating materials – Thermal endurance properties – Part 5: Determination of relative thermal endurance index (RTE) of an insulating material*

IEC 60228, *Conductors of insulated cables*

IEC 60309-1:2021, *Plugs, fixed or portable socket-outlets and couplers for industrial purposes – Part 1: General requirements*

IEC 60352-2, *Solderless connections – Part 2: Crimped connections – General requirements, test methods and practical guidance*

IEC 60352-3:2020, *Solderless connections – Part 3: Accessible insulation displacement (ID) connections – General requirements, test methods and practical guidance*

IEC 60352-4:2020, *Solderless connections – Part 4: Non-accessible insulation displacement (ID) connections – General requirements, test methods and practical guidance*

IEC 60352-5, *Solderless connections – Part 5: Press-in connections – General requirements, test methods and practical guidance*

IEC 60352-6, *Solderless connections – Part 6: Insulation piercing connections – General requirements, test methods and practical guidance*

IEC 60352-7, *Solderless connections – Part 7: Spring clamp connections – General requirements, test methods and practical guidance*

IEC 60352-9, *Solderless connections – Part 9: Ultrasonically welded connections – General requirements, test methods and practical guidance*

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

IEC 60417, *Graphical symbols for use on equipment*
(available at http://www.graphicalsymbols.info/equipment)

IEC 60512-1:2018, *Connectors for electronic equipment – Tests and measurements – Part 1: General*

IEC 60512-1-1:2002, *Connectors for electronic equipment - Tests and measurements - Part 1-1: General examination - Test 1a: Visual examination*

IEC 60512-2-2:2003, *Connectors for electronic equipment - Tests and measurements - Part 2-2: Electrical continuity and contact resistance tests - Test 2b: Contact resistance - Specified test current method*

IEC 60512-4-1:2003, *Connectors for electronic equipment - Tests and measurements - Part 4-1: Voltage stress test - Test 4a: Voltage proof*

IEC 60512-5-2:2002, *Connectors for electronic equipment – Tests and measurements – Part 5-2: Current-carrying capacity tests; Test 5b: Current-temperature derating*

IEC 60512-9-1:2010, *Connectors for electronic equipment - Tests and measurements - Part 9-1: Endurance tests - Test 9a: Mechanical operation*

IEC 60512-11-7:2003, *Connectors for electronic equipment - Tests and measurements – – Part 11-7: Climatic tests – Test 11g: Flowing mixed gas corrosion test*

IEC 60512-13-2:2006, *Connectors for electronic equipment - Tests and measurements - Part 13-2: Mechanical operation tests - Test 13b: Insertion and withdrawal forces*

IEC 60512-15-6:2008, *Connectors for electronic equipment - Tests and measurements - Part 15-6: Connector tests (mechanical) - Test 15f: Effectiveness of connector coupling devices*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage supply systems – Part 1: Principles, requirements and tests*

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IEC 60695-2-11, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products*

IEC 60695-11-10, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

IEC 60998-2-3, *Connecting devices for low-voltage circuits for household and similar purposes – Part 2-3: Particular requirements for connecting devices as separate entities with insulation-piercing clamping units*

IEC 60999-1, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm² up to 35 mm² (included)*

IEC 60999-2, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 2: Particular requirements for clamping units for conductors above 35 mm² up to 300 mm² (included)*

IEC 61032, *Protection of persons and equipment by enclosures – Probes for verification*

IEC 61140, *Protection against electric shock – Common aspects for installation and equipment*

IEC 61210, *Connecting devices – Flat quick-connect terminations for electrical copper conductors –Safety requirements*

IEC 61215-2:2021, *Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 2: Test procedures*

IEC 61238-1-1:2018, *Compression and mechanical connectors for power cables - Part 1-1: Test methods and requirements for compression and mechanical connectors for power cables for rated voltages up to 1 kV (Um = 1,2 kV) tested on non-insulated conductors*

IEC 61238-1-3:2018, *Compression and mechanical connectors for power cables - Part 1-1: Test methods and requirements for compression and mechanical connectors for power cables for rated voltages above 1 kV (Um = 1,2 kV) up to 30 kV (Um = 36 kV) tested on non-insulated conductors*IEC 61730-1:2023, *Photovoltaic (PV) module safety qualification – Part 1: Requirements for construction*

IEC 62368-1, *Audio/video, information and communication technology equipment - Part 1: Safety requirements*

IEC 62444, *Cable glands for electrical installations*

IEC 62548-1, *Photovoltaic (PV) arrays – Design requirements*

IEC 62930, *Electric cables for photovoltaic systems with a voltage rating of 1,5 kV DC*

ISO 527-1, *Plastics- Determination of tensile properties - Part 1: General principles*

ISO 868, *Plastics and ebonite – Determination of indentation hardness by means of a durometer (Shore hardness)*

ISO 4892-2, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc sources*

ISO 4892-3, *Plastics – Methods of exposure to laboratory light sources – Part 3: Fluorescent UV-lamps*

ISO 22479, *Corrosion of metal and alloys – Sulfur dioxide test in a humid atmosphere (fixed gas method)*

ISO 7619-1, *Rubber, vulcanized or thermoplastic - Determination of indentation hardness - Part 1: Durometer method (Shore hardness)*

UL 6703, *Connector for use in Photovoltaic systems*

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UL 746B, Polymeric Materials – Long term property evaluations

EN 50618, *Electric cables for photovoltaic systems*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-581, IEC 60050-826, IEC 60309-1, IEC 60664-1, IEC 60999-1, IEC 61140 and IEC TS 61836, as well as the following apply.

3.1
PV coupler
a means enabling the connection and disconnection of two cables, or of a cable and a Balance-of system (BOS) component, and consisting of a PV pin connector and a PV socket connector from the same manufacturer

Note 1 to entry: A more detailed explanation is given in informative annex D

[SOURCE: IEC 60050-442:1998, 442-07-07, modified: Replacement of “at will of an appliance or equipment to a flexible cable leading to another appliance or equipment” by “of two cables, or of a cable and a Balance of system (BOS) component, and consisting of a PV pin connector and a PV socket connector from the same manufacturer”]

3.2
categories of connectors

3.2.1
connector
component which terminates conductors for the purpose of providing connection to and disconnection from a suitable mating component

Note 1 to entry: Connector type is a designation for all devices of a product family specified by the manufacturer.

Note 2 to entry: In this document the term connector means “PV connector”

Sample Document
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[SOURCE: IEC 60050-581:2008, 581-06-01, Modified: Note 1 to entry and Note 2 to entry added]

3.2.1.1
PV pin connector

connector for PV application having a contact member intended to make electric engagement on its outer surface for mating with the inner surface of another contact member

[SOURCE: IEC 60050-151::2001, 151-12-18 Modified: “connector for PV application having a” has been added]

3.2.1.2
PV socket connector

connector for PV application having a contact member intended to make electric engagement on its inner surface for mating with the outer surface of another contact member

[SOURCE: IEC 60050-151::2001, 151-12-17 Modified: “connector for PV application having a” has been added, Note has been deleted]

3.2.2
multi-way connector
connector with more than one contact

Note 1 to entry: Multiple single-way connectors used in a PV-junction box are not to be regarded as a multi-way connector according to this standard.

3.2.3
connector under voltage
CuV
connector specially designed to be engaged or disengaged in normal use when live but not under load

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Note 1 to entry: In this standard, the term "live" is used if contacts are under an applied voltage but not necessarily carrying current. The term "load" is used if a current is flowing through the contacts.

3.2.4
connector without breaking capacity
COC
connector which is not allowed to be engaged or disengaged in normal use when live or under load

[SOURCE: IEC 60050-581:2008, 581-27-73]

3.2.5
free connector
connector for attachment to the free end of a wire or cable

[SOURCE: IEC 60050-581:2008, 581-06-12]

3.2.6
built-in connector

a pre-manufactured connector that is subsequently integrated into an enclosure

3.2.7
integrated connector
a connector assembly that is manufactured as an integral component during enclosure fabrication

3.2.8
factory assembled connector
connector that is intended to be assembled and terminated to the cable under controlled conditions at a manufacturer’s location.

3.2.9
field assembled connector
connector that is intended to be assembled and terminated to the cable in the field.

Sample Document

3.2.10
connector for Class II equipment
connector in which the protection against indirect contact is realized by double or reinforced insulation

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Note 1 to entry: Class II according to IEC 61140

3.3
manufacturer
organization, situated at a stated location or locations, that carries out or controls such stages in the manufacture, assessment, handling and storage of a product that enables it to accept responsibility for continued compliance of the product with the relevant requirements and undertakes all obligations in that connection

Note 1 to entry: The terms "manufacturer" and "organization" are often used interchangeably.

[SOURCE: IEC 60050-426: 426-27-01 with following modification: Note 2 has not been considered]

3.4
product family
a group of products specified by the manufacturer, consisting of connectors that are designed to be mutually mateable

3.5
kind of connection

3.5.1
non-rewirable connector
connector so constructed that the cable cannot be separated from the connector without making it permanently useless

[SOURCE: IEC 60050-581:581-26-33, , modified “useless”]

3.5.2
rewirable connector

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