

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Junction boxes for photovoltaic modules – Safety requirements and tests

Boîtes de jonction pour modules photovoltaïques – Exigences de sécurité et essais



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**JUNCTION BOXES FOR PHOTOVOLTAIC MODULES –
SAFETY REQUIREMENTS AND TESTS**

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International Standard IEC 62790 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

The European Standard EN 50548 (first edition, 2011), has served as a basis for the elaboration of this standard.

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

FDIS	Report on voting
82/876/FDIS	82/902/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 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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JUNCTION BOXES FOR PHOTOVOLTAIC MODULES – SAFETY REQUIREMENTS AND TESTS

1 Scope

This International Standard describes safety requirements, constructional requirements and tests for junction boxes up to 1 500 V dc for use on photovoltaic modules according to class II of IEC 61140:2001.

This standard applies also to enclosures mounted on PV-modules containing electronic circuits for converting, controlling, monitoring or similar operations. Additional requirements concerning the relevant operations are applied under consideration of the environmental conditions of the PV-modules. This standard does not apply to the electronic circuits of these devices, for which other IEC-standards apply.

NOTE For junction boxes according to classes 0 and III of IEC 61140:2001, in photovoltaic-systems, this standard can be used as a guideline.

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

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

IEC 60068-2-14:2009, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-70, *Environmental testing – Part 2: Tests – Test Xb: Abrasion of markings and letterings caused by rubbing of fingers and hands*

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 60228, *Conductors of insulated cables*

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

IEC 60512-12-1, *Connectors for electronic equipment – Tests and measurements – Part 12-1: Soldering tests – Test 12a: Solderability, wetting, solder bath method*

IEC 60512-12-2, *Connectors for electronic equipment – Tests and measurements – Part 12-2: Soldering tests – Test 12b: Solderability, wetting, soldering iron method*

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

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC/TR 60664-2-1, *Insulation coordination for equipment within low-voltage systems – Part 2-1: Application guide – Explanation of the application of the IEC 60664 series, dimensioning examples and dielectric testing*

IEC 60664-3, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

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 60695-11-20:1999, *Fire hazard testing – Part 11-20: Test flames – 500 W flame test methods*

IEC/TR 60943, *Guidance concerning the permissible temperature rise for parts of electrical equipment, in particular for terminals*

IEC 60947-7-1, *Low-voltage switchgear and controlgear – Part 7-1: Ancillary equipment – Terminal blocks for copper conductors*

IEC 60998-2-1, *Connecting devices for low-voltage circuits for household and similar purposes – Part 2-1: Particular requirements for connecting devices as separate entities with screw-type clamping units*

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

IEC 60999-1:2000, *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 61140:2001, *Protection against electric shock – Common aspects for installation and equipment*

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

IEC 61730-2:2004, *Photovoltaic (PV) module safety qualification – Part 2: Requirements for testing*

IEC 62852, *Connectors for photovoltaic systems – Safety requirements and tests*

ISO 868:2003, *Plastics and ebonite – Determination of indentation hardness by means of a durometer (Shore hardness)*

ISO 4892-2:2013, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc lamps*

ISO 4892-3:2006, *Plastics – Methods of exposure to laboratory light sources – Part 3: Fluorescent UV lamps*

EN 50618, *Electric cables for photovoltaic systems*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

module junction box

combination of parts, such as boxes, covers, cover-plates, lids, box extensions, accessories, etc., providing after assembly and installation at the photovoltaic-module in normal use, an appropriate protection against external influences, and a defined protection against contact with enclosed live parts from any accessible direction

3.1.1

junction box for re-opening

junction box that can be opened at any time

Note 1 to entry: It may contain rewirable and non-rewirable connections.

3.1.1.1

junction box for factory wiring

junction box which is attached and connected to the PV module under controlled conditions, usually at manufacturer's location

3.1.1.2

junction box for field wiring

junction box containing wiring connections that are intended to be made in the field

3.1.2

junction box, not intended to be re-opened

junction box that cannot be opened after mounting in the end application

Note 1 to entry: It may contain rewirable and non-rewirable connections.

3.2

cable gland

device permitting the introduction of one or more electric cables into the junction box so as to maintain the relevant type of protection

[SOURCE: IEC 60050-426:2008, 426-04-18, modified – "and/or fibre optics" has been deleted and "an electrical apparatus" has been replaced by "the junction box".]

3.3

sealing

method for providing the ability of a component to resist the ingress of contaminants

[SOURCE: IEC 60050-581:2008, 581-23-16]