SLOVENSKI STANDARD
SIST EN 50548:2011/A2:2015

01-april-2015

Priključnice fotonapetostnih modulov - Dopolnilo A2

Junction boxes for photovoltaic modules

Anschlussdosen für Photovoltaik-Module

Boîtes de jonction pour modules photovoltaïques

Ta slovenski standard je istoveten z: **EN 50548:2011/A2:2014**

ICS:

27.160	Sončna energija	Solar energy engineering

SIST EN 50548:2011/A2:2015 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

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EN 50548:2011/A2

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English Version

Junction boxes for photovoltaic modules

Boîtes de jonction pour modules photovoltaïques

Anschlussdosen für Photovoltaik-Module

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European Committee for Electrotechnical Standardization
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Europäisches Komitee für Elektrotechnische Normung

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Contents

Foreword

This document (EN 50548:2011/A2:2014) has been prepared by CLC/TC 82 "Solar photovoltaic energy systems".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2015-10-13
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2017-10-13

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1 Modification to Clause 2

Add *the following referenced documents:*

EN 60352-2, *Solderless connections — Part 2: Crimped connections — General requirements, test methods and practical guidance (IEC 60352-2*)

EN 60352-3, *Solderless connections — Part 3: Solderless accessible insulation displacement connections - General requirements, test methods and practical guidance (IEC 60352-3)*

EN 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 insulating piercing clamping units (IEC 60998-2-3)*

EN 60352-4, *Solderless connections — Part 4: Solderless non-accessible insulation displacement connections - General requirements, test methods and practical guidance (IEC 60352-4)*

EN 60352-5, *Solderless connections — Part 5*: *Press-in connections - General requirements, test methods and practical guidance (IEC 60352-5)*

EN 60352-6, *Solderless connections — Part 6: Insulation piercing connections — General requirements, test methods and practical guidance (IEC 60352-6)*

EN 60352-7, *Solderless connections — Part 7: Spring clamp connections; General requirements, test methods and practical guidance (IEC 60352-7)*

EN 61210, *Connecting devices — Flat quick-connect terminations for electrical copper conductors — Safety requirements (IEC 61210)*

EN 61191-1, *Printed board assemblies — Part 1: Generic specification — Requirements for soldered electrical and electronic assemblies using surface mount and related assembly technologies (IEC 61191-1)*

2 Modification to 4.4

Delete *the* NOTE.

3 Modification to 4.4.1

Replace “No insulated” *in the second sentence by:*

“Non-insulated…”

4 Modification to 4.4.2

Replace *the complete 4.4.2 by the following text:*

Connecting devices shall meet the following requirements under the conditions according to 5.1.3:

a)	crimped connections	according to EN 60352-2
b)	insulation displacement connections	according to EN 60352-3 (accessible IDC) or EN 60998-2-3
c)	insulation displacement connections	according to EN 60352-4 (non-accessible IDC) or EN 60998-2-3
d)	press-in connections	according to EN 60352-5
e)	insulation piercing connections	according to EN 60352-6 or EN 60998-2-3
f)	screwless-type clamping units	according to EN 60999-1 or EN 60999-2 or EN 60352-7
g)	screw-type clamping units	according to EN 60999-1 or EN 60999-2
h)	flat, quick-connect terminations	according to and EN 61210
i)	Terminal blocks	EN 60947-7-1
j)	Soldered connections	EN 61191-1

Different terminals or connecting technologies may be used if they fulfil a comparable level of safety as the above-mentioned standards. They shall provide sufficient means to be held in position after connection.

Terminations by connectors inside the junction box shall meet the relevant requirements according to EN 50521.

Soldered connections of cables and ribbons shall have additional means for retaining the conductor in position.

All connections and terminations shall be prevented from mechanical and excessive thermal stress which could cause increased contact resistance.

5 Modification to 4.17.1

Replace *the second sentence by the following:*

“All current carrying parts shall consist of base metal and plating, such that under normal operation a sufficient mechanical strength, electrical conductivity and corrosion resistance is given.”

6 Modification to 5.3.9.1

Add *the following text after the first sentence:*

“Before performance of thermal cycle the initial contact resistance has to be measured as described in 5.3.19. After the environmental and subsequent dielectric strength tests of test sequence E the measurement has to be repeated.”

Replace *the second paragraph by the following text:*

"The test shall be carried out in a climatic chamber. A thermal cycle according to Figure 1 shall be applied. For number of cycles refer to 5.3.9.2 and 5.3.9.3."

Add *the following text after the third paragraph:*

"During thermal cycle test the rated current shall be applied such that it is conducted via each termination as described in 5.3.19."

7 Modification to 5.3.19

Replace *5.3.19 by the following text:*

"All terminations and connection methods shall be tested according to their relevant EN-standards as listed in 4.4.

Contact resistance has to be measured for all terminations and connection methods for external cables and ribbons before and after environmental and subsequent dielectric strength tests of test sequence E.

The contact resistance shall be measured between external cable and connected ribbon as shown in figure 5 by application of a d.c. current of 1 A. The voltage drop has to be measured and the contact resistance has to be calculated. These determined values have to be listed as reference resistance and shall not exceed 5 mΩ. After accomplishment of thermal cycles and subsequent dielectric strength tests the measurement of contact resistance shall be repeated as described above. The determined values shall not exceed 150 % of the reference resistance.

Internal connectors shall meet the relevant tests of EN 50521:2008, except for the number of cycles in the thermal cycle (shock) test (6.3.11) that shall be 800."

8 Modification to Table 10

Replace *Table 10 by the following table:*

Table 10 – Test sequence I, test group E
(tests to be performed consecutively in this order)

1	2	3	4	5	6
Test phase	**Designation**	**Test according to**	**Specimen**	**Measurements, designation**	**Requirements**
E1	Degree of protection	5.3.4.2	Specimen according to 5.2.5 with attached and short-circuited ribbons	IP-code	IP55 according to IEC 60529
E2	Dielectric strength	5.3.6 b)		r.m.s withstand voltage test 2 000 V + (4 x rated voltage)	No flashover or breakdown of voltage
E3	Initial measurement	5.3.9		Test current: 1A Measuring points: external cable and ribbon See 5.3.19	Contact resistance ≤ 5 mΩ
E4	Wet leakage current test	5.3.16		Insulation resistance	Insulation resistance not less than 400 MΩ
E5	Thermal cycle test	5.3.9		Test cycles: 200	No visible damages, which could impair function or safety
E6	Dielectric strength	5.3.6 b)		r.m.s withstand voltage test 2 000 V + (4 x rated voltage)	No flashover or breakdown of voltage
E7	Dielectric strength	5.3.6 a)		Impulse withstand test	No flashover or breakdown of voltage
E8	Final measurement	5.3.9		Test current: 1A Measuring points: external cable and ribbon See 5.3.19	Contact resistance ≤ 150 % of initial measurement in E3