

# SLOVENSKI STANDARD

## SIST EN IEC 60352-4:2020

01-oktober-2020

Nadomešča:

SIST EN 60352-4:2002

SIST EN 60352-4:2002/A1:2002

---

**Nespajkani spoji - 4. del: Nedostopni izolacijsko prebodni spoji - Splošne zahteve, preskusne metode in praktični napotki (IEC 60352-4:2020)**

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

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)

Lötfreie elektrische Verbindungen - Teil 4: Lötfreie nichtzugängliche Schneidklemmverbindungen - Allgemeine Anforderungen, Prüfverfahren und Anwendungshinweise (IEC 60352-4:2020)

<https://standards.iteh.ai/catalog/standards/sist/97f83d6e-76e0-49cf-a192-bceeb7ce7f84/sist-en-iec-60352-4-2020>

Connexions sans soudure - Partie 4: Connexions autodénudantes, non accessibles sans soudure - Règles générales, méthodes d'essai et guide pratique (IEC 60352-4:2020)

**Ta slovenski standard je istoveten z: EN IEC 60352-4:2020**

---

**ICS:**

29.120.20      Spojni elementi      Connecting devices

**SIST EN IEC 60352-4:2020**      en

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN IEC 60352-4:2020

<https://standards.iteh.ai/catalog/standards/sist/97f83d6e-76e0-49cf-a192-bcee7ce7f84/sist-en-iec-60352-4-2020>

EUROPEAN STANDARD

EN IEC 60352-4

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2020

ICS 29.120.20

Supersedes EN 60352-4:1994 and all of its amendments  
and corrigenda (if any)

English Version

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

Connexions sans soudure - Partie 4: Connexions  
autodénudantes (CAD) non accessibles - Règles générales,  
méthodes d'essai et guide pratique  
(IEC 60352-4:2020)

Lötfreie Verbindungen - Teil 4: Nichtzugängliche  
Schneidklemmverbindungen - Allgemeine Anforderungen,  
Prüfverfahren und Anwendungshinweise  
(IEC 60352-4:2020)

This European Standard was approved by CENELEC on 2020-07-16. 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, Turkey 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

**EN IEC 60352-4:2020 (E)****European foreword**

The text of document 48B/2804/FDIS, future edition 2 of IEC 60352-4, prepared by SC 48B "Electrical connectors" of IEC/TC 48 "Electrical connectors and mechanical structures for electrical and electronic equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60352-4:2020.

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) 2021-04-16
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-07-16

This document supersedes EN 60352-4:1994 and all of its amendments and corrigenda (if any).

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.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

**Endorsement notice**

<https://standards.iteh.ai/catalog/standards/sist/97f83d6e-76e0-49cf-a192-bceeb7ce7f84/sist-en-iec-60352-4-2020>

The text of the International Standard IEC 60352-4:2020 was approved by CENELEC as a European Standard without any modification.

## 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.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-581	-	International Electrotechnical Vocabulary - Part 581: Electromechanical components for electronic equipment	-	-
IEC 60068-1	-	Environmental testing - Part 1: General and guidance	EN 60068-1	-
IEC 60228	-	Conductors of insulated cables	EN 60228	-
IEC 60512-1	-	Connectors for electrical and electronic equipment - Tests and measurements - Part 1: Generic specification	EN IEC 60512-1	-
IEC 60512-1-1	-	Connectors for electronic equipment - Tests and measurements - Part 1-1: General examination - Test 1a: Visual examination	EN 60512-1-1	-
IEC 60512-2-1	-	Connectors for electronic equipment - Tests and measurements - Part 2-1: Electrical continuity and contact resistance tests - Test 2a: Contact resistance - Millivolt level method	EN 60512-2-1	-
IEC 60512-2-2	-	Connectors for electronic equipment - Tests and measurements - Part 2-2: Electrical continuity and contact resistance tests - Test 2b: Contact resistance - Specified test current method	EN 60512-2-2	-
IEC 60512-2-5	-	Connectors for electronic equipment - Tests and measurements - Part 2-5: Electrical continuity and contact resistance tests - Test 2e: Contact disturbance	EN 60512-2-5	-

## EN IEC 60352-4:2020 (E)

IEC 60512-6-4	-	Connectors for electronic equipment - Tests and measurements - Part 6-4: Dynamic stress tests - Test 6d: Vibration (sinusoidal)	EN 60512-6-4	-
IEC 60512-9-2	-	Connectors for electronic equipment - Tests and measurements - Part 9-2: Endurance tests - Test 9b: Electrical load and temperature	EN 60512-9-2	-
IEC 60512-11-1	-	Connectors for electrical and electronic equipment - Tests and measurements - Part 11-1: Climatic tests - Test 11a - Climatic sequence	EN IEC 60512-11-1	-
IEC 60512-11-4	-	Connectors for electronic equipment - Tests and measurements - Part 11-4: Climatic tests - Test 11d: Rapid change of temperature	EN 60512-11-4	-
IEC 60512-11-7	-	Connectors for electronic equipment - Tests and measurements - Part 11-7: Climatic tests - Test 11g: Flowing mixed gas corrosion test	EN 60512-11-7	-
IEC 60512-11-9	-	Connectors for electronic equipment - Tests and measurements - Part 11-9: Climatic tests - Test 11i: Dry heat	EN 60512-11-9	-
IEC 60512-11-10	-	Connectors for electronic equipment - Tests and measurements - Part 11-10: Climatic tests - Test 11j: Cold	EN 60512-11-10	-
IEC 60512-11-12	-	Connectors for electronic equipment - Tests and measurements - Part 11-12: Climatic tests - Test 11m: Damp heat, cyclic	EN 60512-11-12	-

iTech STANDARD PREVIEW

(standards.iteh.ai)

SIST EN IEC 60352-4:2020

<https://standards.iteh.ai/catalog/standards/sist/9783d6e-76e0-49cf-a192-bceeb7ce7f84/sist-en-iec-60352-4-2020>



IEC 60352-4

Edition 2.0 2020-06

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

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

[SIST EN IEC 60352-4:2020](https://standards.iteh.ai/catalog/standards/sist/97f83d6e-76e0-49cf-a192-1617c841e0e0/iec-60352-4-2020)

**Connexions sans soudure –  
Partie 4: Connexions autodénudantes (CAD) non accessibles –  
Règles générales, méthodes d'essai et guide pratique**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

ICS 29.120.20

ISBN 978-2-8322-8413-1

**Warning! Make sure that you obtained this publication from an authorized distributor.  
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

## CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	9
2 Normative references .....	9
3 Terms and definitions .....	10
4 Workmanship.....	14
5 Prerequisites for basic test schedule .....	14
5.1 General.....	14
5.2 Prerequisites for ID terminations .....	14
5.2.1 Non-accessible ID terminations materials .....	14
5.2.2 Non-accessible ID terminations dimensions .....	14
5.2.3 Non-accessible ID terminations surface finishes .....	14
5.2.4 Non-accessible ID terminations design features.....	15
5.3 Prerequisites for wires and conductors.....	15
5.3.1 Wire and conductors.....	15
5.3.2 Conductor materials.....	15
5.3.3 Wire and conductor dimensions .....	15
5.3.4 Conductor surface finishes .....	15
5.3.5 Wire insulation.....	15
5.4 Non-accessible insulation displacement connections (ID connections) .....	16
6 Testing.....	16
6.1 Overview.....	16
6.2 General.....	16
6.3 Standard conditions for testing.....	16
6.4 Preconditioning.....	16
6.5 Recovery .....	17
6.6 Specimen.....	17
7 Tests .....	17
7.1 General examination .....	17
7.2 Mechanical tests .....	17
7.2.1 General .....	17
7.2.2 Bending of the cable/wire .....	17
7.2.3 Vibration .....	18
7.2.4 Repeated connection and disconnection, reusable non-accessible ID terminations .....	19
7.2.5 Microsection .....	20
7.3 Electrical tests .....	21
7.3.1 General .....	21
7.3.2 Contact resistance .....	21
7.3.3 Electrical load and temperature .....	22
7.4 Climatic tests .....	22
7.4.1 General .....	22
7.4.2 Rapid change of temperature.....	22
7.4.3 Climatic sequence .....	23
7.4.4 Flowing mixed gas, corrosion test.....	23
7.4.5 Damp heat, cyclic .....	23



8	Test schedules .....	23
8.1	General.....	23
8.1.1	Overview .....	23
8.1.2	ID connections with terminations suitable for a range of wire diameters .....	24
8.1.3	Multipole connectors.....	24
8.2	Basic test schedule .....	24
8.2.1	General .....	24
8.2.2	Initial examination.....	25
8.2.3	Testing of non-accessible ID connections .....	25
8.3	Full test schedule.....	26
8.3.1	General .....	26
8.3.2	Initial examination.....	27
8.3.3	Testing of non-accessible ID connections .....	27
8.4	Flow charts .....	30
Annex A	(informative) Practical guidance.....	33
A.1	General information on non-accessible ID connections .....	33
A.1.1	General .....	33
A.1.2	Advantages of non-accessible ID connections .....	33
A.2	Current-carrying capacity considerations .....	34
A.3	Tool information.....	34
A.3.1	Wire insertion tool.....	34
A.3.2	Wire extraction tool.....	34
A.3.3	Combination tool.....	34
A.4	Termination information.....	35
A.4.1	General.....	35
A.4.2	Design features.....	35
A.4.3	Materials .....	35
A.4.4	Surface finishes .....	35
A.5	Wire information.....	35
A.5.1	Type .....	35
A.5.2	Dimensions.....	35
A.5.3	Surface finishes.....	35
A.5.4	Insulation.....	35
A.5.5	Ribbon cable .....	36
A.6	Connection information.....	36
A.6.1	General .....	36
A.6.2	ID connections made with more than one wire in one connection slot .....	37
Annex B	(informative) Application examples .....	38
B.1	ID connections .....	38
B.1.1	ID connections which can be examined by destructive inspection only.....	38
B.1.2	ID connections which can be examined by non-destructive inspection .....	39
B.2	General additional information about ID connections as part of a multi-pole connector.....	40
B.2.1	Mounting and bending of wire bundles/cables with contacts having ID connections .....	40
B.2.2	Mating and unmating of multipole connectors with ID contacts.....	41
B.3	Examples for good transversal microsection or negative results (see Figure B.6).....	41
B.4	Final remarks.....	42

Bibliography.....	43
Figure 1 – Example of accessible and non-accessible insulation displacement connection .....	7
Figure 2 – Insulation displacement connection .....	11
Figure 3 – Slot .....	12
Figure 4 – Beam .....	13
Figure 5 – Guiding block .....	13
Figure 6 – Test arrangement, bending of the cable/wire .....	18
Figure 7 – Test arrangement, vibration .....	19
Figure 8 – Non-accessible ID connection made with a stranded conductor.....	20
Figure 9 – Non-accessible ID connection made with a solid round conductor .....	20
Figure 10 – Test arrangement, contact resistance .....	21
Figure 11 – Basic test schedule (see 8.2) .....	31
Figure 12 – Full test schedule (see 8.3) .....	32
Figure A.1 – Example of a non-accessible ID connection with two conductors with different cross-sections in one connection slot; wires with stranded conductors .....	37
Figure B.1 – Examples of correct ID connections with closed housing design, opened or visible by microsectioning .....	38
Figure B.2 – Parts of connector housings to ensure correct ID connections (examples) .....	40
Figure B.3 – Mounting of wire bundles/cables with contacts having ID connections.....	40
Figure B.4 – Bending of wire bundles of connectors.....	41
Figure B.5 – Mating and unmating of multipole connectors.....	41
Figure B.6 – IDC: transversal microsection.....	41
Table 1 – Vibration, preferred test severities.....	19
Table 2 – Contact resistance of non-accessible ID connections, maximum permitted values.....	22
Table 3 – Number of specimens required .....	24
Table 4 – Qualification test schedule – Test group 1 .....	25
Table 5 – Qualification test schedule – Test group 2 .....	26
Table 6 – Qualification test schedule – Test group 3 .....	26
Table 7 – Qualification test schedule – Test group 4 .....	26
Table 8 – Qualification test schedule – Test group A.....	27
Table 9 – Qualification test schedule – Test group B.....	28
Table 10 – Qualification test schedule – Test group C .....	28
Table 11 – Qualification test schedule – Test group D .....	29
Table 12 – Qualification test schedule – Test group E.....	30

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SOLDERLESS CONNECTIONS –****Part 4: Non-accessible insulation displacement (ID) connections –  
General requirements, test methods and practical guidance**

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

International Standard IEC 60352-4 has been prepared by subcommittee 48B: Electrical connectors, of IEC technical committee 48: Electrical connectors and mechanical structures for electrical and electronic equipment.

This second edition cancels and replaces the first edition, published in 1994, and its Amendment 1 (2000). This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) Transferred Clauses 9 to 13 into Annex A (informative).
- b) The figures were re-drawn for clarity.

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

FDIS	Report on voting
48B/2804/FDIS	48B/2820/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.

A list of all parts in the IEC 60352 series, published under the general title *Solderless connections*, can be found on the IEC website.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN IEC 60352-4:2020](#)

<https://standards.iteh.ai/catalog/standards/sist/97f83d6e-76e0-49cf-a192-bcee7ce7f84/sist-en-iec-60352-4-2020>

## INTRODUCTION

The two following parts of IEC 60352 are available on solderless insulation displacement connections:

- Part 3: Accessible insulation displacement (ID) connections – General requirements, test methods and practical guidance;
- Part 4: Non-accessible insulation displacement (ID) connections – General requirements, test methods and practical guidance.

NOTE In this document the term "insulation displacement" is abbreviated to "ID", for example "ID connection", "ID termination".

Figure 1 illustrates examples of accessible and non-accessible insulation displacement connections that clarify the difference among them.

Part 4 includes requirements and relevant tests (normative) as well as a practical guidance in Annex A (informative) for non-accessible ID connections.

Two test schedules are provided:

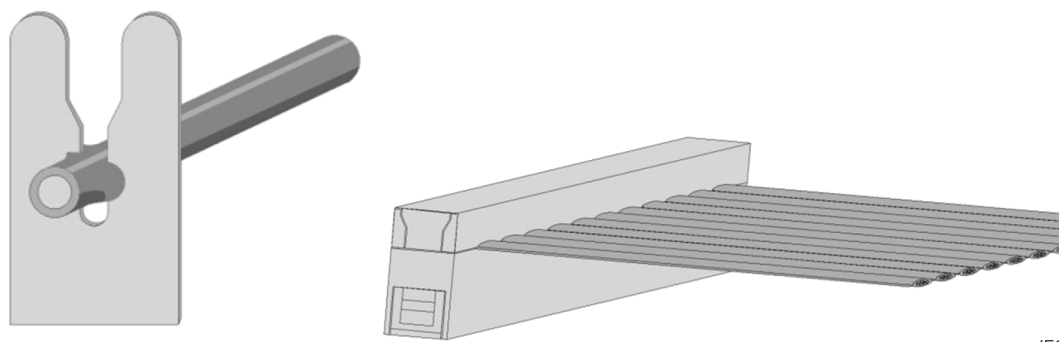
- the basic test schedule which applies to insulation displacement connections which conform to all prerequisites of Clause 5. It is derived from experience with successful applications of such connections;
- the full test schedule which applies to insulation displacement connections which do not fully conform to all prerequisites of Clause 5, for example which are manufactured using materials or finishes not included in Clause 5.

This philosophy permits cost and time effective performance verification using a limited basic test schedule for established insulation displacement connections and an expanded full test schedule for connections requiring more extensive performance validation.

The suitability of the non-accessible ID connection implies that the specified requirements and tests apply to all factors involved in producing a suitable ID connection, namely:

- the ID termination, which may be part of a single-pole or multipole connector;
- the wire (or range of wires) for which the termination is suitable;
- the tools (if any) required to produce that type of solderless connection.

The practical guidance provided in Annex A (informative) serves as a guideline for the required workmanship. Attention is drawn to the fact that some industries (e.g. automotive, aerospace, nuclear, military) may have specific workmanship standards and/or quality requirements, which are outside the scope of this document.



IEC

**Figure 1 – Example of accessible and non-accessible insulation displacement connection**