

Solderless connections —

Part 6: Solderless insulation piercing connections — General requirements, test methods and practical guidance

The European Standard EN 60352-6:1997 has the status of a
British Standard

ICS 31.220.10

National foreword

This British Standard is the English language version of EN 60352-6:1997. It is identical with IEC 60352-6:1997.

The UK participation in its preparation was entrusted by Technical Committee EPL/48, Electromechanical components for electronic equipment, to Subcommittee EPL/48/2, Connectors for electronic equipment, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

From 1 January 1997, all IEC publications have the number 60 000 added to the old number. For instance, IEC 27-1 has been renumbered as IEC 60027-1. For a period of time during the change over from one numbering system to the other, publications may contain identifiers from both systems.

Cross-references

Attention is drawn to the fact that CEN and CENELEC Standards normally include an annex which lists normative references to international publications with their corresponding European publications. The British Standards which implement these international or European publications may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 22 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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English version

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General requirements, test methods and practical guidance
(IEC 60352-6:1997)

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Partie 6: Connexions à perçement
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Lötfreie Verbindungen
Teil 6: Durchdringverbindungen
Allgemeine Anforderungen,
Prüfverfahren und Anwendungshinweise
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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat 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 Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
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Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 48B/596/FDIS, future edition 1 of IEC 60352-6, prepared by SC 48B, Connectors, of IEC TC 48, Electromechanical components and mechanical structures for electronic equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60352-6 on 1997-10-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1998-07-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1998-07-01

Annexes designated “normative” are part of the body of the standard.

In this standard, Annex ZA is normative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60352-6:1997 was approved by CENELEC as a European Standard without any modification.

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Introduction

This part of IEC 60352 includes requirements, tests and practical guidance information.

Two test schedules are provided.

The qualification test schedule applies to insulation piercing connections which conform to all requirements of clause 4.

These requirements are derived from experience with successful applications of such insulation piercing connections.

The application test schedule applies to insulation piercing connections which are part of a component and are already qualified.

1 Scope and object

This part of IEC 60352 is applicable to insulation piercing connections made with stranded wires and tinsel-wire, flat conductors and flat flexible circuitries for use in telecommunication equipment and in electronic devices employing similar techniques.

Information on materials and data from industrial experience is included in addition to the test procedures to provide electrically stable connections under prescribed environmental conditions.

The object of this standard is to

- determine the suitability of insulation piercing connections under specified mechanical, electrical, and atmospheric conditions;
- provide a means of comparing test results, when the tools used to make the connections are of different designs or manufacture.

There are different designs and materials for insulation piercing terminations in use. For this reason only fundamental parameters of the termination, the performance requirements of the conductor and the complete connection are specified in this standard.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60352. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 60352 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60050(581):1978, *International Electrotechnical Vocabulary (IEV) — Chapter 581: Electromechanical components for electronic equipment*.

IEC 60068-1:1988, *Environmental testing — Part 1: General and guidance Amendment 1 (1992)*.

IEC 60512-1:1994, *Electromechanical components for electronic equipment — Basic testing procedures and measuring methods — Part 1: General*.

IEC 60512-2:1985, *Electromechanical components for electronic equipment — Basic testing procedures and measuring methods — Part 2: General examination, electrical continuity and contact resistance tests, insulation tests and voltage stress tests Amendment 1 (1994)*.

IEC 60512-4:1976, *Electromechanical components for electronic equipment; basic testing procedures and measuring methods — Part 4: Dynamic stress tests*.

IEC 60512-5:1992, *Electromechanical components for electronic equipment; basic testing procedures and measuring methods — Part 5: Impact tests (free components), static load tests (fixed components), endurance tests and overload tests*.

IEC 60512-6:1984, *Electromechanical components for electronic equipment; basic testing procedures and measuring methods — Part 6: Climatic tests and soldering tests*.

IEC 60512-11-1:1995, *Electromechanical components for electronic equipment — Basic testing procedures and measuring methods — Part 11: Climatic tests — Section 1: Test 11 a — Climatic sequence*.

IEC 60512-11-7:1996, *Electromechanical components for electronic equipment — Basic testing procedures and measuring methods — Part 11: Climatic tests — Section 7: Test 11 g: Flowing mixed gas corrosion test*.

IEC 60512-16-20:1996, *Electromechanical components for electronic equipment — Basic testing procedures and measuring methods — Part 16: Mechanical tests on contacts and terminations — Section 20: Test 16t: Mechanical strength (wired termination of solderless connections).*

IEC 60603-7:1996, *Connectors for frequencies below 3 MHz for use with printed boards — Part 7: Detail specification for connectors, 8-way, including fixed and free connectors with common mating features, with assessed quality.*

3 Definitions

For the purposes of this part of IEC 60352, the terms and definitions of IEC 60050(581) and IEC 60512-1 and the following additional terms and definitions apply.

3.1 insulation piercing connection

A solderless connection made by suitable piercing elements, which pierce the insulation and provide contact by deforming or penetrating the conductor. [IEV 581-03-42]

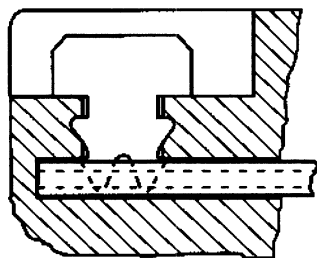
3.1.1

integrated insulation piercing connection with stranded conductor or tinsel-wire

an integrated insulation piercing connection which is part of a multipole connector

for example, for the free connector (see note) the piercing zone and its housing are integral parts of the connection (see Figure 1)

usually all insulation piercing connections of the connector are made in one step



IEC 1086/97

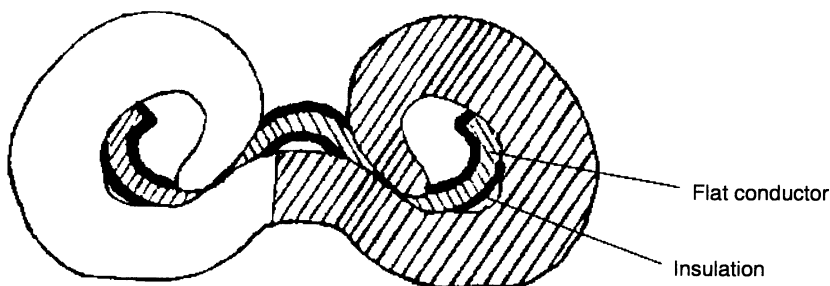
Figure 1 — Example of an integrated insulation piercing connection (one connection shown)

NOTE An example for the application is the free connector according to IEC 60603-7.

3.1.2

insulation piercing connection with flat conductors or flat flexible circuitries

an insulation piercing connection formed by lances which pierce and penetrate the flat conductor (see Figure 2)



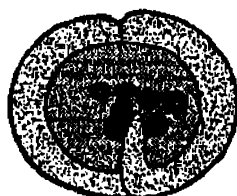
IEC 1087/97

Figure 2 — Example of an insulation piercing connection with flat conductor

3.1.3

insulation piercing barrel connection with stranded conductors or tinsel-wires of discrete wires

an insulation piercing connection made by lances in a barrel which pierce the insulation, and make contact with the conductor strands (see Figure 3)



IEC 1088/97

Figure 3 — Example of an insulation piercing connection in a barrel with stranded wires

3.2

insulation piercing termination

a termination to accept different types of insulated conductors for the purpose of establishing an insulation piercing connection [IEV 581-03-63]

3.3

insulation piercing zone

that portion of the contact designed and intended to effect the piercing of the insulation and provide contact with the conductor (see 6.3.1) [IEV 581-03-53]

4 Requirements

4.1 Workmanship

The connections shall be processed in a careful and workmanlike manner, in accordance with good current practice.

4.2 Tools

Tools shall be used and inspected according to the instructions given by the manufacturer(s) of the tool and/or the connector.

The tools shall be able to make uniformly reliable insulation piercing connections during their lifetime.

The tools shall be designed to operate in such a manner that unacceptable damage to the insulation piercing termination and/or conductors is avoided.

Hand tools shall be provided with a full cycle mechanism.

Automatic tools shall be provided with a full cycle mechanism or equivalent safeguard.

Tools are evaluated by testing insulation piercing connections made with the tools to be evaluated.

4.3 Insulation piercing terminations

4.3.1 Materials

— Metallic parts

Suitable grades of copper or copper alloy such as copper-tin (bronze), copper-zinc (brass) or beryllium copper shall be used.

— Insulating parts

For insulation piercing connections according to 3.1.1 the component housing material shall be polycarbonate or similar plastic material.

For insulation piercing connections according to 3.1.3 the wire insulation shall be PVC or another material appropriate for this connecting technique.