IEC 61076-1

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 1
AMENDEMENT 1

Connectors for electronic equipment – Product requirements – Part 1: Generic specification

Connecteurs pour équipements électroniques – Exigences de produit – Partie 1: Spécification générique

IEC 61076-1:2006-04/AMD1:2019-01(en-fr)

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Connectors for electronic equipment – Product requirements – Part 1: Generic specification

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

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FOREWORD

This amendment has been prepared by subcommittee 48B: Electrical connectors, of IEC technical committee 48: Electrical connectors and mechanical structures for electrical and electronic equipment.

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

FDIS	Report on voting
48B/2678/FDIS	48B/2691/RVD

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

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

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- withdrawn,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

1.4.5 Compatibility

Replace the first paragraph with the following new text:

Compatibility comprises specification of intermountability, intermateability and/or interchangeability, as well as of interoperability and backward compatibility, where applicable, as detailed in 2.2.3 and in Annex B (normative) to guarantee compliance with requirements of mated connector pairs, of which the individual connectors are supplied by different sources.

2.1 Terms and definitions

Add the following new terms and definitions:

2.1.6
interoperability
interoperability of different IEC 61076-1 connectors and of IEC 61076-1 connectors with connectors of other families (e.g. IEC 60603-7 series) is ensured by compliance with the specified interface dimensions, when they have the same number of contacts, the same electrical wiring-related dimensions and when the lowest electrical, mechanical and climatic performance (performance level) among the two connectors is suitable for the intended application

SEE: Clause B.5.

2.1.7
number of contacts
number of contacts (or ways) that a connector owns, including the protective and/or functional earth contact(s), if any

Note 1 to entry: A connector for removable contacts is characterized by its number of contact positions (seats): its number of contacts (ways) may be lower than the number of contact positions (seats).

Note 2 to entry: The same number of contacts does not grants the same electrical interface: the geometry of said contacts may be different while their number is the same.

2.1.8
overall dimensions
dimensions providing the overall space occupied by a connector

Note 1 to entry: Two connectors of the same gender may have the same overall dimensions but different mounting dimensions and/or different interface dimensions

2.1.9
interface dimensions
set of dimensions required to fully describe the connector's mating interface, belonging to both the connector insert and to the relevant electric contacts

Note 1 to entry: Interface dimensions enable the proper functioning of a mated set of connectors according to the relevant product detail specification or manufacturer's detail specification.

Note 2 to entry: Two connectors with same interface dimensions have the same number of contact seats (or positions), whereas they may not show the same number of contacts (ways).

2.1.10
mounting dimensions
dimensions enabling the mounting of a connector

Note 1 to entry: Examples of mounting dimensions are panel cutout size, size and interaxes of fixing holes or threads.

Note 2 to entry: The geometry of the mounting interface of Printed Circuit Board connectors to the PCB belongs to the mounting dimensions: two Printed Circuit Board connectors of the same gender with the same mounting dimensions share the same pattern and pitch of their contacts.

Note 3 to entry: Two connectors not of the Printed Circuit Board type of the same gender with the same mounting dimensions may have different interface dimensions.

Note 4 to entry: Two connectors of the same gender with the same mounting dimensions may have different overall dimensions.

2.1.11
electrical wiring-related dimensions
dimensions related to the wiring of the connector, i.e. to its number and type of contacts (ways)

Note 1 to entry: Two connectors of the same gender with the same electrical wiring-related dimensions have the same number of contacts (ways) or contact positions (seats), the same dimensions of these contacts or contact positions, the same overall dimensions, the same interface dimensions, and if they are Printed Circuit Board connectors, the same mounting dimensions.

2.1.12
electrical, mechanical and climatic performances
levels of electrical, mechanical and climatic performance assigned to a connector in the relevant product detail specification or manufacturer's detail specification, therein verified through dedicated groups of tests

Note 1 to entry: The electrical performance includes signal integrity.

Add the following new Annex B:

Annex B
(normative)

Levels of compatibility

B.1 General

In applications where products according an IEC 61076-1 and any of the related IEC 61076-3-1xx product detail specifications are used, a mixture of connectors from different sources may be available. No problems should occur if all of these products fully comply with the same standard (product detail specification) and have the same ratings. In cases where these products were given a different rating by the manufacturer, and also when dimensional details are deviating, it is important to know and consider the right level of compatibility.

The levels of compatibility are intended to compare connectors of the same gender on their capability to be mated with a complementary connector of the different gender. The levels indicate the functional differences (if any) between connector products of the same gender but from different sources.

A product detail specification under this standard may declare a certain level of compatibility – e.g. in terms of backward compatibility – with other product detail specification(s) within the same family of standards (e.g. this IEC 61076-1 and the related IEC 61076-3-1xx family) or with a cross reference to a connector covered by a product detail specification belonging to a different IEC family.

In fact, for historical reasons some recent additions have been assigned to the IEC 61076-3 family of standards, while other new connectors have been assigned to the IEC 60603-7 family of rectangular connectors. For this reason a similar Annex has been included in the generic specification IEC 60603-7 in order to align the terminology used in both families in regard to levels of compatibility.

The levels of compatibility between connectors from different sources are characterized – as a function of the standardization degree – by 4 levels. These levels are already defined in 2.2.3.2 to 2.2.3.5 of this document and shall, when appropriate, be indicated in the relevant detail product specification of connectors.

In Table B.1, for each level of compatibility the required parameters are indicated by “x“ in a graphical way.

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Table B.1 – Levels of compatibility [b) c)] and required parameters [b)]

	Level of compatibility of IEC 61076-1	Number of contacts	Overall dimensions	Interface dimensions	Mounting dimensions	Electrical wiring-related dimensions	Electrical, mechanical and climatic performance
Intermountable [a)]	Level 1		x		x		
Intermateable [a)]	Level 2			x		x	
Intermountable [a)] **and intermateable** [a)]	Level 3		x	x	x	x	
Interoperable [a)]		x		x		x	x [d)]
Interchangeable [a)]	Level 4	x	x	x	x	x	x
Backward compatible [e)]		x		x		x	x [e)]

a) The prefix "*inter*" in the terms "intermountable", "intermateable", "interoperable", and "interchangeable" has the meaning of "interchangeably" (adv), i.e. intermountable = interchangeably mountable, and so on. Thus the prefix "inter" has not the meaning "among them", i.e. intermountable does not mean "mountable among them", intermateable does not mean "mateable among them". In other words, two intermateable connectors are not a male and a female connector mateable among them.

b) Levels of compatibility and relevant required parameters include also the influence of features for latching, locking and keying.

c) Special attention is required for safety: all levels of compatibility may pose a certain risk for safety, especially when voltages higher than SELV levels (50 V AC / 120 V DC) and/or high currents are applied.

d) Two interoperable connectors shall grant electrical, mechanical and climatic performance suitable for the application. In other words their performance level is not necessarily the same, but none of them owns a performance level unsuitable for the application.

e) IEC 60050-581:2008, 581-24-08: "feature of connectors which ensures at least the lower requirements in case of mating connectors with higher and lower requirements". The backward compatibility requirement ensures that a free or fixed connector in compliance with this standard, when mated with a fixed or free connector in compliance with any lower frequency IEC 61076-3 series connector standard or IEC 60603-7 series connector standard, fully complies with the requirements of the lower frequency IEC 61076-3 series connector standard or IEC 60603-7 series connector standard.

B.2 Intermountability

The term intermountable (adj) and consequently intermountability (noun) is defined in IEC 60050-581:2008, 581-24-04*:* "pertaining to each of two connectors when their overall dimensions, dimensions on printed board or panel cut-out, and cable termination are identical".

This level is defined as level 1 – Intermountable in 2.2.3.2 of this document. This levels standardizes only overall dimensions and mounting dimensions on printed board or panel cut-out and cable termination assembly; mating face dimensions are not relevant to standardize intermountability.

This means that each of two intermountable connectors will fit in a given location (e.g. a position/footprint on a PCB, and/or in a panel cut-out, and/or at the end of a cable). The electrical (e.g. different current rating) or mechanical performance (one connector may be a free or fixed connector with male contacts, the other one with female contacts) may be different. This IEC 60050-581 description even allows two connectors with two completely different types of interface.

Intermountability – once declared for a connector by its manufacturer with respect to certain dimensions common to other products or product families – shall be declared by referencing an unambiguous set of dimensions. This may also be achieved by reference to a set of dimensions as given by a published standard.

B.3 Intermateability

The term intermateable (adj) and consequently intermateability (noun) is defined in IEC 60050-581:2008, 581-24-07: “pertaining to each of two connectors when they feature identical dimensions for electrical and dimensional interfaces”.

This level is defined as level 2 – Intermateable in 2.2.3.3 of this document. This levels standardizes only dimensions of electrical and mechanical interfaces. The electrical and mechanical performances and the functionality of connectors from different sources, when mated, are not fully guaranteed.

In other words: here, each of two connectors will fit in one counterpart connector, but the electrical, mechanical and environmental performances and the functionality may be different. For instance, the two connectors from different sources may contain a different number of contacts, different conductive materials, differently rated insulating materials – if the relevant product detail specification allows such choice, different – although compatible – contact plating, different sizing of wire terminations or conductive paths, thus differently sized allowed wiring).

Intermateability shall be proven by testing the mechanical performance and verification of the electrical conductivity of the mated electrical contacts according the relevant requirements of the Product Detail Specification.

NOTE 1 Intermateable connectors can have different numbers of contacts (ways), i.e. a different electrical interface, within the same mechanical interface. It is allowed that the missing contacts of one of them do not mate with the contacts of the corresponding mating connector, as well as the opposite, i.e. the contacts in excess in one of them do not find contacts in the corresponding mating connector.

A connector can have less female contacts but due to the lack of holes to accept the male contacts may not be intermateable with a connector having a full set of male contacts.

As the mechanical interface does not include overall dimensions and mounting dimensions covered by intermountability (Clause B.2), two connectors can be intermateable but not intermountable.

NOTE 2 In general, product detail specifications for connectors should include dimensions to provide that two connectors in compliance with said detail specification are both intermountable and intermateable, see further B.4.

B.4 Intermountability and intermateability

The terms intermountable (adj) and intermateable (adj) and consequently the relevant nouns “intermountability” and “intermateability” are already defined in the IEC 60050-581 as described in Clause B.2 and Clause B.3.

There is a further level of compatibility defined as level 3 – Intermountable and intermateable in 2.2.3.4 of this document. This level standardizes mounting dimensions, electrical and mechanical interface and overall dimensions.

This means that each of two intermountable and intermateable connectors will fit in a given location (e.g. a position/footprint on a PCB, and/or in a panel cut-out, and/or at the end of a cable) and each of two connectors will fit in one counterpart connector, but the electrical, mechanical and environmental performances and the functionality may be different. For instance, the two connectors from different sources may contain a different number of contacts within a compatible mating face geometry, different conductive materials, differently rated insulating materials (if the relevant product detail specification allows such choice), different – although compatible – contact plating, different sizing of wire terminations or conductive paths, thus differently sized allowed wiring.

Intermateability shall be demonstrated as described in Clause B.3., intermountability as described in Clause B.2.

NOTE Intermateable connectors can have different numbers of contacts (ways), i.e. a different electrical interface, within the same mechanical interface. It is allowed that the missing contacts of one of them do not mate with the contacts of the corresponding mating connector, as well as the opposite, i.e. the contacts in excess of one of them do not find correspondence in the corresponding mating connector.

B.5 Interoperability

In the case of interoperability, the performance level of this interoperability is always that of the less performing connector, but the performance level shall be suitable for the application.

In other words one of the two interoperable connectors of the same gender may be provided with a performance level in excess of the requirements for the application, none can be provided with performance level unfit for the application.

B.6 Interchangeability

The term interchangeable (adj.) and consequently interchangeability (noun) is defined in IEC 60050-581:2008, 581-24-03: “pertaining to a connector when all elements guaranteeing compliance of electrical, mechanical and climatic performance of mated connectors when individual connector halves from different sources are identical."

This level of compatibility is defined as level 4 – Interchangeable in 2.2.3.5 of this document. This level standardizes all the elements guaranteeing compliance of the electrical, mechanical and environmental performances of mated connector pairs when individual connectors are from different sources.

To be interchangeable, the form, fit, function and performance of connectors from different sources are identical, so that a connector from one source can be replaced by a similar connector from another source without loss of functionality or performance of the connector pair.

NOTE The term “identical” when addressing dimensions and ratings is used herein with the meaning “within the tolerances provided either by a published product detail specification (standard sheet) or as a result of a comparison of the different manufacturer product detail specifications and/or drawings”.

Interchangeability shall be proven by comparison of the drawings and completion of the full test schedule of the Detail Product Specification on all possible combinations of the interchangeable connectors.

B.7 Backward compatibility

Backward compatibility is defined in IEC 60050-581:2008, 581-24-08: “feature of connectors which ensures at least the lower requirements in case of mating connectors with higher and lower requirements”.

Backward compatibility is a subset of Intermateability. Backward compatibility between two connectors from different sources or different type or product family is only possible when these connectors are intermateable as per Clause B.3. In cases where connectors are intermateable they may have different performance levels. For backward compatible connectors, as a minimum the lower of these two levels is guaranteed.

Backward compatibility shall be proven by testing all possible combinations of the backward compatible connectors against the full test schedule of the Detail Product Specification with the lower requirement.