

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Connectors for electrical and electronic equipment – Product requirements – Part 2-010: Circular connectors – Detail specification for connectors with outer or inner push-pull locking mechanism, based on mating interfaces according to IEC 61076-2-101, IEC 61076-2-109, IEC 61076-2-111 and IEC 61076-2-113

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Connecteurs pour équipements électriques et électroniques – Exigences de produit –

Partie 2-010: Connecteurs circulaires – Spécification particulière relative aux connecteurs avec mécanisme de verrouillage de type pousser-tirer externe ou interne, basés sur des interfaces d'accouplement conformes à l'IEC 61076-2-101, l'IEC 61076-2-109, l'IEC 61076-2-111 et l'IEC 61076-2-113



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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Connectors for electrical and electronic equipment – Product requirements – Part 2-010: Circular connectors – Detail specification for connectors with outer or inner push-pull locking mechanism, based on mating interfaces according to IEC 61076-2-101, IEC 61076-2-109, IEC 61076-2-111 and IEC 61076-2-113

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT –
PRODUCT REQUIREMENTS –****Part 2-010: Circular connectors – Detail specification for connectors
with outer or inner push-pull locking mechanism, based on mating
interfaces according to IEC 61076-2-101, IEC 61076-2-109,
IEC 61076-2-111 and IEC 61076-2-113**

FOREWORD

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International Standard IEC 61076-2-010 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 International Standard is based on the following documents:

FDIS	Report on voting
48B/2876/FDIS	48B/2887/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts in the IEC 61076 series, published under the general title *Connectors for electrical and electronic equipment – Product requirements*, 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 webstore.iec.ch in the data related to the specific document. At this date, the document will be

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INTRODUCTION

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this International Standard may involve the use of patent(s) concerning the free connectors

The IEC takes no position concerning the evidence, validity and scope of these patent rights.

The holder of this patent right has assured the IEC that he/she is willing to give free licences with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with the IEC.

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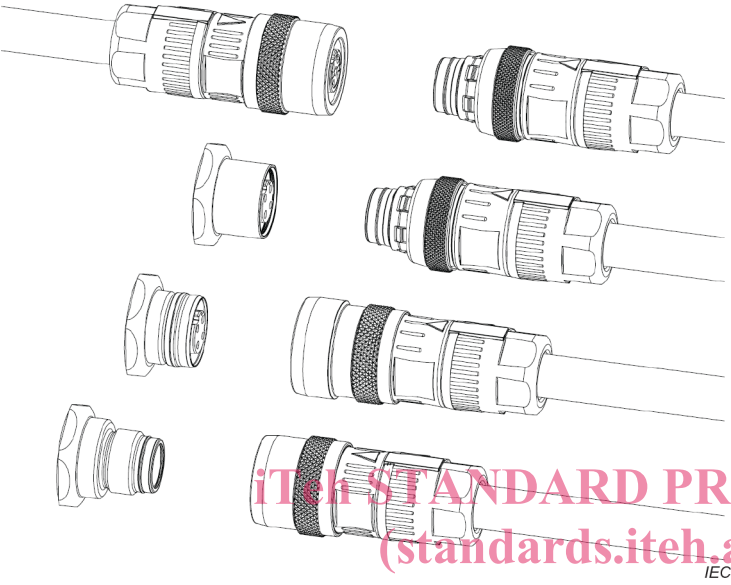
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Table 1 – Content of document

<p>IEC SC 48B – Electrical connectors</p> <p>Specification available from:</p> <p>IEC General secretariat</p> <p>Or from the addresses shown on the inside cover.</p>	<p>IEC 61076-2-010 Ed. 1</p>
<p>DETAIL SPECIFICATION in accordance with IEC 61076-1</p>	
 <p>Technical drawings of various circular M12 electrical connectors. The drawings show different types of connectors: some with push-pull locking, some with male and female contacts, and some with front, rear, or single hole mounting. The drawings are arranged in a grid-like fashion, showing different views and configurations of the connectors.</p>	<p>Circular M12 connectors with push-pull locking for power and/or signal and/or data transmission</p> <p>Fixed connectors with male and female contacts, mateable with M12 screw or push-pull plugs</p> <p>Free cable connectors with male or female contacts with push-pull locking</p> <p>Rewireable – Non-rewirable</p> <p>Fixed connectors, with front, rear or single hole mounting</p> <p>Straight and right-angled free cable connectors</p>

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CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT – PRODUCT REQUIREMENTS –

Part 2-010: Circular connectors – Detail specification for connectors with outer or inner push-pull locking mechanism, based on mating interfaces according to IEC 61076-2-101, IEC 61076-2-109, IEC 61076-2-111 and IEC 61076-2-113

1 Scope

This part of IEC 61076-2 specifies circular connectors with a push-pull locking mechanism of a size derived from, and thus being compatible with M12 screw-locking connectors (free connectors with screw-locking according to IEC 61076-2-101, IEC 61076-2-109, IEC 61076-2-111 or IEC 61076-2-113 are compatible with push-pull fixed interfaces according to this document) and with mating interfaces according to IEC 61076-2-101, IEC 61076-2-109, IEC 61076-2-111 (except codings E in general and coding F for inner push-pull) or IEC 61076-2-113.

A fixed connector with push-pull locking according to this document is intermateable with a correspondingly coded free connector with M12 screw-locking according to any of the above mentioned standards.

NOTE 1 M12 is the dimension of the thread of the screw-locking mechanism of circular connectors with M12 screw-locking.

NOTE 2 IEC 61076-2-012 defines another inner push-pull for fixed female connectors which is however not compatible to the inner push-pull defined in this document. Annex C shows the different styles of female free connectors to extend male free connectors.

This document covers both:

- a) power connectors with current ratings up to 16 A and voltage ratings up to 630 V, typically used for power supply and power applications in industrial premises, and
- b) connectors for data and signal transmission with frequencies up to 500 MHz.

These connectors consist of both, fixed and free connectors, either rewirable or non-rewirable, with M12 push-pull locking as explained above. Male connectors have round contacts from Ø 0,6 mm up to Ø 1,5 mm. In addition, the push-pull mechanisms consist of 2 different push-pull designs:

- c) An outer push-pull for male and female fixed connector, where the locking groove is placed onto the outer cylindrical surface of the housing. The outer push-pull for female fixed connectors is made for 2 different types of male connectors. It has locking means for both types on its outer surface.

NOTE 3 For design and dimensions see 5.3.2 and 5.3.3.

- d) An inner push-pull for female fixed connectors and for male free connectors, where the locking means are placed onto the inner cylindrical surface of the housing.

NOTE 4 For design and dimensions see 5.3.4.

The different codings provided by IEC 61076-2 series detail specifications mentioned within this document prevent the mating of accordingly coded male or female connectors to any other similarly sized interfaces, covered by other standards and the cross-mating between the different codings provided by any other IEC 61076-2 series detail specification mentioned within this document.

2 Normative references

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.

IEC 60050-581:2008, *International Electrotechnical Vocabulary (IEV) – Part 581: Electromechanical components for electronic equipment*

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

IEC 60512-1, *Connectors for electrical and electronic equipment – Tests and measurements – Part 1: Generic specification*

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*

IEC 60512-3-1, *Connectors for electronic equipment – Tests and measurements – Part 3-1: Insulation tests – Test 3a: Insulation resistance*

IEC 60512-4-1, *Connectors for electronic equipment – Tests and measurements – Part 4-1: Voltage stress tests – Test 4a: Voltage proof*

IEC 60512-5-1, *Connectors for electronic equipment – Tests and measurements – Part 5-1: Current-carrying capacity tests – Test 5a: Temperature rise*

IEC 60512-6-3, *Connectors for electronic equipment – Tests and measurements – Part 6-3: Dynamic stress tests – Test 6c: Shock*

IEC 60512-6-4, *Connectors for electronic equipment – Tests and measurements – Part 6-4: Dynamic stress tests – Test 6d: Vibration (sinusoidal)*

IEC 60512-9-1, *Connectors for electronic equipment – Tests and measurements – Part 9-1: Endurance tests – Test 9a: Mechanical operation*

IEC 60512-13-1, *Connectors for electronic equipment – Tests and measurements – Part 13-1: Mechanical operation tests – Test 13a: Engaging and separating forces*

IEC 60512-13-2, *Connectors for electronic equipment – Tests and measurements – Part 13-2: Mechanical operation tests – Test 13b: Insertion and withdrawal forces*

IEC 60512-13-5, *Connectors for electronic equipment – Tests and measurements – Part 13-5: Mechanical operation tests – Test 13e: Polarizing and keying method*

IEC 60512-15-6, *Connectors for electronic equipment – Tests and measurements – Part 15-6: Connector tests (mechanical) – Test 15f: Effectiveness of connector coupling devices*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60529:1989/AMD1:1999

IEC 60529:1989/AMD2:2013

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

IEC 60998-2-1:2002, *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 61076-1:2006, *Connectors for electronic equipment – Product requirements – Part 1: Generic specification*

IEC 61076-1:2006/AMD1:2019

IEC 61076-2-012, *Connectors for electrical and electronic equipment – Product requirements Part 2-012: Circular connectors – Detail specification for connectors with inner push-pull locking, based on M12 connector interfaces according to IEC 61076-2-101, IEC 61076-2-109, IEC 61076-2-111 and IEC 61076-2-113*

IEC 61076-2-101:2012, *Connectors for electronic equipment – Product requirements – Part 2-101: Circular connectors – Detail specification for M12 connectors with screw-locking*

IEC 61076-2-109:2014, *Connectors for electronic equipment – Product requirements – Part 2-109: Circular connectors – Detail specification for connectors with M 12 × 1 screw-locking, for data transmission frequencies up to 500 MHz*

IEC 61076-2-111:2017, *Connectors for electrical and electronic equipment – Product requirements – Part 2-111: Circular connectors – Detail specification for power connectors with M12 screw-locking*

IEC 61076-2-113:2017, *Connectors for electronic equipment – Product requirements – Part 2-113: Circular connectors – Detail specification for connectors with M12 screw locking with power and signal contacts for data transmission with frequency up to 100 MHz*

IEC 61984, *Connectors – Safety requirements and tests*
IEC 61076-2-010:2021
<https://standards.iteh.ai/catalog/standards/sist/7ab301b1-ec66-46b7-998e-61eba8cfae7/iec-61076-2-010-2021>

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-581, IEC 60512-1 and IEC 61076-1 apply, together with the following.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

mounting orientation

circular mounting position of the connector in relation to the polarization of the mating interface

Note 1 to entry: Where the free connector has an angled cable entry (as opposed to a straight cable entry), the angle between the entry direction and the polarisation keyway should be specified.

4 Technical information

4.1 System of levels

4.1.1 Performance levels

Performance levels for these connectors (mating cycles for the mating interface only) are specified in the applicable standard, either IEC 61076-2-101, IEC 61076-2-109, IEC 61076-2-111 or IEC 61076-2-113. The same performance level (number of cycles of mechanical operations, i.e. one locking and one unlocking operation) shall apply to the specific complete connector with the push-pull locking described herein.

A qualification of the push-pull locking mechanism for the highest performance level shall cover the qualifications for all lower performance levels required by the various mating interfaces, which are not subject to re-qualification for all those aspects already covered in the relevant IEC standards mentioned above.

4.1.2 Compatibility levels, according to IEC 61076-1

The connectors according to this document are intermateable according to IEC 61076-1.

4.2 Classification into climatic categories

For the classifications of the connectors into climatic categories in accordance with the general rules given in IEC 60068-1, see the applicable standard, either IEC 61076-2-101, IEC 61076-2-109, IEC 61076-2-111 or IEC 61076-2-113.

The qualification of the push-pull locking interface for the most demanding climatic category (lowest LCT, highest UCT, highest number of days of damp heat, steady state) will cover all less demanding climatic categories established for the mating interfaces described in the above-mentioned IEC 61076-2-101, IEC 61076-2-109, IEC 61076-2-111 or IEC 61076-2-113.

4.3 Contact terminations

The contact terminations shall be of the following types: screw, crimp, spring type, insulation piercing, insulation displacement, press-in or solder according to the applicable standard for the mating interface (either IEC 61076-2-101, IEC 61076-2-109, IEC 61076-2-111 or IEC 61076-2-113).

4.4 Available connector codings

The available codings are shown in Table 2.