

Connectors for electrical and electronic equipment -
Product requirements - Part 2-101: Circular
connectors - Detail specification for M12 connectors
with screw-locking

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>See Eesti standard EVS-EN IEC 61076-2-101:2025 sisaldab Euroopa standardi EN IEC 61076-2-101:2025 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 10.01.2025.</p> <p>Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.</p>	<p>This Estonian standard EVS-EN IEC 61076-2-101:2025 consists of the English text of the European standard EN IEC 61076-2-101:2025.</p> <p>This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.</p> <p>Date of Availability of the European standard is 10.01.2025.</p> <p>The standard is available from the Estonian Centre for Standardisation and Accreditation.</p>
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English Version

Connectors for electrical and electronic equipment - Product requirements - Part 2-101: Circular connectors - Detail specification for M12 connectors with screw-locking (IEC 61076-2-101:2024)

Connecteurs pour équipements électriques et électroniques
- Exigences de produit - Partie 2-101: Connecteurs
circulaires - Spécification particulière pour les connecteurs
M12 à vis
(IEC 61076-2-101:2024)

Steckverbinder für elektronische Einrichtungen -
Produktanforderungen - Teil 2-101: Rundsteckverbinder -
Bauartspezifikation für Steckverbinder M12 mit
Schraubverriegelung
(IEC 61076-2-101:2024)

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European foreword

The text of document 48B/3111/FDIS, future edition 4 of IEC 61076-2-101, 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 61076-2-101:2025.

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IEC 61076-2-113:2017	NOTE	Approved as EN 61076-2-113:2017 (not modified)

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Connectors for electrical and electronic equipment – Product requirements –
Part 2-101: Circular connectors – Detail specification for M12 connectors with
screw-locking**

**Connecteurs pour équipements électriques et électroniques – Exigences de
produit –
Partie 2-101: Connecteurs circulaires – Spécification particulière pour les
connecteurs M12 à vis**



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INTERNATIONAL STANDARD

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connecteurs M12 à vis**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT –
PRODUCT REQUIREMENTS –****Part 2-101: Circular connectors –
Detail specification for M12 connectors with screw-locking**

FOREWORD

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IEC 61076-2-101 has been prepared by subcommittee 48B: Electrical connectors, of IEC technical committee 48: Electrical connectors and mechanical structures for electrical and electronic equipment. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2012. This edition constitutes a technical revision.

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

- a) Technical specifications regarding dimensional information (Clause 5) and characteristics (Clause 6) have been updated, and new subclauses have been added.
- b) New style NF (free connectors) has been added.

- c) Fixed connectors with glass to metal seals (former styles WM, XM, YM, ZM and WF, XF, TF and ZF) are no longer covered by this document: relevant definitions and requirements have been removed.
- d) The P-coding has been eliminated.
- e) Annex B (informative) Steel conduit thread, sizes has been deleted and a new Annex B (informative) Orientation of cable outlet in relation to coding has been added.
- f) The dimension specification of former styles AM and BM have been moved into a new Annex C (normative).

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

Draft	Report on voting
48B/3111/FDIS	48B/3129/RVD

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

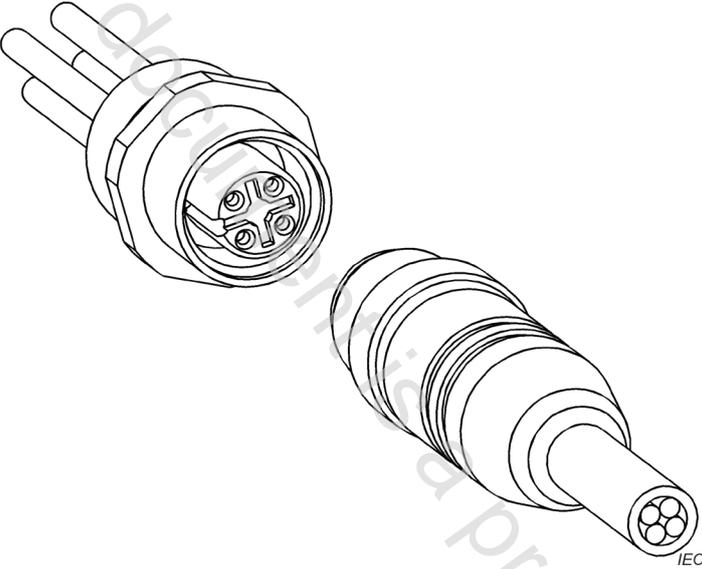
The language used for the development of this International Standard is English.

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/publications.

A list of all parts of IEC 61076 series, 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

- reconfirmed,
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<p>IEC SC 48B – Electrical connectors</p> <p>Specification available from: IEC General secretariat or from the addresses shown on the inside cover.</p>	<p>IEC 61076-2-101 Ed 4</p>
<p>DETAIL SPECIFICATION in accordance with IEC 61076-1</p>	
<p>Outline drawing</p> 	<p>Product description</p> <p>Circular connectors M12</p> <p>2- to 17-way</p> <p>Male and female contacts</p> <p>Male and female connectors</p> <p>Rewirable – Non-rewirable</p> <hr/> <p>Free cable connectors</p> <p>Straight and right angle connectors</p> <p>Fixed connectors</p> <p>Flange mounting</p> <p>Single hole mounting</p> <p>Connector insert</p>

CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT – PRODUCT REQUIREMENTS –

Part 2-101: Circular connectors – Detail specification for M12 connectors with screw-locking

1 Scope

This part of IEC 61076 describes M12 screw-locking circular connectors with 2-way up to 17-way, for data transmission with frequencies up to 100 MHz and signal and power transmission at up to 250 V rated voltage and up to 4 A rated current per contact.

These connectors consist of fixed and free connectors, either rewirable or non-rewirable.

Male connectors have round contacts, \varnothing 0,6 mm, \varnothing 0,76 mm, \varnothing 0,8 mm or \varnothing 1,0 mm according to number of ways and coding, all contacts with the same size.

The different codings prevent the mating of differently coded male and female connectors.

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

NOTE 2 These connectors are typically used for connecting industrial automation devices for process measurement and control.

NOTE 3 Several other IEC standards are available covering additional styles of circular connectors with M12 × 1 screw-locking, see Bibliography.

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, *International Electrotechnical Vocabulary – Part 581: Electromechanical components for electronic equipment*

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

IEC 60352 (all parts), *Solderless connections*

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

IEC 60512-1-1, *Connectors for electronic equipment – Tests and measurements – Part 1-1: General examination – Test 1a: Visual examination*

IEC 60512-1-2, *Connectors for electronic equipment – Tests and measurements – Part 1-2: General examination – Test 1b: Examination of dimension and mass*

IEC 60512-1-100, *Connectors for electronic equipment – Tests and measurements – Part 1-100: General – Applicable publications*

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 60512-2-2, *Connectors for electronic equipment – Tests and measurements – Part 2-2: Electrical continuity and contact resistance tests – Test 2b: Contact resistance – Specified test current method*

IEC 60512-2-5, *Connectors for electronic equipment – Tests and measurements – Part 2-5: Electrical continuity and contact resistance tests – Test 2e: Contact disturbance*

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 60512-9-2, *Connectors for electronic equipment – Tests and measurements – Part 9-2: Endurance tests – Test 9b: Electrical load and temperature*

IEC 60512-11-1, *Connectors for electrical and electronic equipment – Tests and measurements – Part 11: Climatic tests – Section 1: Test 11a – Climatic sequence*

IEC 60512-11-3, *Connectors for electronic equipment – Tests and measurements – Part 11-3: Climatic tests – Test 11c: Damp heat, steady state*

IEC 60512-11-4, *Connectors for electronic equipment – Tests and measurements – Part 11-4: Climatic tests – Test 11d: Rapid change of temperature*

IEC 60512-11-7, *Connectors for electronic equipment – Tests and measurements – Part 11-7: Climatic tests – Test 11g: Flowing mixed gas corrosion test*

IEC 60512-11-9, *Connectors for electronic equipment – Tests and measurements – Part 11-9: Climatic tests – Test 11i: Dry heat*

IEC 60512-11-10, *Connectors for electronic equipment – Tests and measurements – Part 11-10: Climatic tests – Test 11j: Cold*

IEC 60512-11-12, *Connectors for electronic equipment – Tests and measurements – Part 11-12: Climatic tests – Test 11m: Damp heat, cyclic*

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 60512-14-7, *Electromechanical components for electronic equipment – Basic testing procedures and measuring methods – Part 14: Sealing tests – Section 7: Test 14g: Impacting water*

IEC 60512-16-5, *Connectors for electronic equipment – Tests and measurements – Part 16-5: Mechanical tests on contacts and terminations – Test 16e: Gauge retention force (resilient contacts)*

IEC 60512-19-3, *Electromechanical components for electronic equipment – Basic testing procedures and measuring methods – Part 19: Chemical resistance tests – Section 3: Test 19c – Fluid resistance*

IEC 60512-23-3, *Connectors for electrical and electronic equipment – Tests and measurements – Part 23-3: Screening and filtering tests – Test 23c: Shielding effectiveness of connectors and accessories – Line injection method*

IEC 60512-29-100, *Connectors for electronic equipment – Tests and measurements – Part 29-100: Signal integrity tests up to 500 MHz on M12 style connectors – Tests 29a to 29g*

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

IEC 60529:1989/AMD1:1999

IEC 60529:1989/AMD2:2013

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60998-2-1, *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 60999-1, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm² up to 35 mm² (included)*

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

IEC 61076-1:2006/AMD1:2019

IEC 61076-2-010:2021, *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*

IEC 61076-2-012:2020, *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 61984:2008, *Connectors – Safety requirements and tests*

IEC 62197-1, *Connectors for electronic equipment – Quality assessment requirements – Part 1: Generic specification*

IEC TR 63040:2016, *Guidance on clearances and creepage distances in particular for distances equal to or less than 2 mm – Test results of research on influencing parameters*

ISO 11469:2016, *Plastics – Generic identification and marking of plastics products*

ISO 21920-1:2021, *Geometrical product specifications (GPS) – Surface texture: Profile – Part 1: Indication of surface texture*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-581, IEC 61076-1, IEC 60512-1 and IEC 61984, as well as the following apply.

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

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

3.1

mounting orientation

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

4 Technical information

4.1 Recommended method of termination for rewirable connectors

The contact terminations for rewirable connectors shall be of the following types: screw, crimp, spring clamp, insulation piercing, insulation displacement, press-in connections according to the respective part of the IEC 60352 series and to IEC 60999-1, as applicable, or solder.

4.2 Connector coding, number of contacts, ratings and characteristics

Table 1 provides the codings of these connectors as a function of their variants, number of contacts, rated voltage and rated current.

Table 1 – Ratings of connectors

Coding	Variants	Number of contacts	Rated voltage AC or DC	Rated current A
A-coding	5-way	2 to 4 ^b	250 V	4
		2 to 5 ^c	50 V AC / 63 V DC	
	8-way	6 to 8	32 V	2
	12-way	9 to 12	32 V	1,5
	17-way	13 to 17	32 V	1,5
B-coding	5-way	5	50 V AC / 63 V DC	4
C-coding	3-way (2 + PE)	3 (2 + PE)	250 V	4
	4-way (3 + PE)	4 (3 + PE)	250 V	4
	5-way (4 + FE)	5 (4 + FE)	50 V AC / 63 V DC	2
	6-way (5 + FE)	6 (5 + FE)	32 V	2
D-coding	4-way	4	60 V DC ^a	4

^a The M12 connectors with D-coding (4-way) are used as data connectors for transmission at frequencies up to 100 MHz and operating voltage up to 60 V DC. Tests: see test group FP.

^b Any configuration excludes contact 5.

^c Any configuration includes contact 5.

Insulation resistance: $10^8 \Omega$ min.

Contact spacing: see interface dimensions in 5.4.