IEC 61076-2-101

Edition 3.0 2012-04

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

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

IEC 61076-2-101:2012

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FOREWORD

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International Standard IEC 61076-2-101 has been prepared by sub-committee 48B: Connectors, of Technical Committee 48: Electromechanical components and mechanical structures for electronic equipment.

This third edition cancels and replaces the second edition published in 2008 and its corrigendum published in 2010. It constitutes a technical revision.

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

- The drawings of some styles have been corrected.
- A new style with maximum 17 poles, with A-coding, has been added, as new applications for the industrial process measurement and control require a high number of poles in M12 circular connectors. The existing styles and dimensions which were

specified in IEC 61076-2-101 Ed. 2 are further applicable for the added interface dimension of the 17 poles versions.

– Removal of the type designation and ordering information, former Tables 6 and 7 have been updated accordingly.

– Inclusion of the technical content of IEC PAS 61076-2-108, which will be withdrawn after publication of this International Standard. The drawings have been updated and correction to the title of Figure 9 was made.

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

FDIS	Report on voting
48B/2279/FDIS	48B/2288/RVD

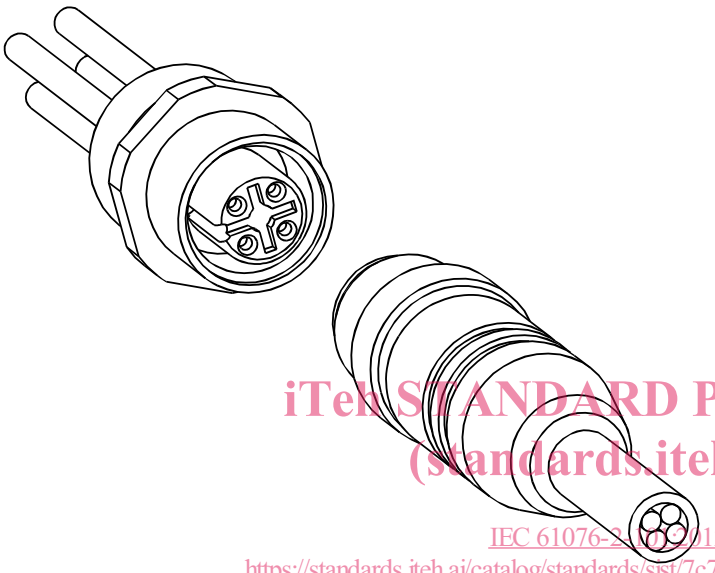
Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

A list of all parts of IEC 61076 series, under the general title *Connectors for electronic equipment – Product requirements*, can be found on the IEC website.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site 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.

IEC SC 48B – Connectors Specification available from: IEC General secretariat or from the addresses shown on the inside cover.	IEC 61076-2-101 Ed. 3.0
ELECTRONIC COMPONENTS DETAIL SPECIFICATION in accordance with IEC 61076-1	
 IEC 2336/03	Circular connectors M12 2 to 17 way Male and female contacts Male and female connectors Rewireable – Non-rewireable
	Free cable connectors Straight and right angle connectors Fixed connectors Fixed connectors with glass to metal seals (pin contacts only) Flange mounting Single hole mounting Pin sockets

CONNECTORS FOR 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 circular connectors typically used for industrial process measurement and control. These connectors consist of fixed and free connectors either rewireable or non-rewireable, with screw-locking. The connectors with glass to metal seal are fixed connectors only which consist of fixed glass to metal sealed styles with rewireable male contacts and are intermateable with corresponding free connectors according to this International Standard. Male connectors have round contacts ∅ 0,6 mm, ∅ 0,76 mm, ∅ 0,8 mm and ∅ 1,0 mm.

The different codings prevent the mating of these coded male or female connectors to any other interfaces and cross-mating between the different codings.

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

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 60068-2-60, *Environmental testing – Part 2: Tests –Test Ke: Flowing mixed gas corrosion test*

IEC 60352 (all parts), *Solderless connections*

IEC 60423:2007, *Conduit systems for cable management – Outside diameters of conduits for electrical installations and threads for conduits and fittings*

IEC 60512 (all parts), *Connectors for electronic equipment – Tests and measurements*

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

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

IEC 60664-1, *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 (all parts), *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units*

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

IEC 61984, *Connectors – Safety requirements and tests*

ISO 1302*: Technical drawings – Methods of indicating surface texture*

3 Technical information

3.1 Terms and definitions

For the purposes of this document, terms and definitions from IEC 60050-581 as well as the following apply.

3.1.1
mounting orientation
circular mounting position of the connector in relation to the polarization of the mating interface

NOTE Where the free connector has an angled cable entry (as opposed to an in-line cable entry), the angle between the cable entry direction and the polarization keyway should be specified.

3.1.2
glass to metal seal
a form of construction whereby the connector contacts are housed in a glass insert which is inside a metal connector shell so as to form a connector with a hermetic seal which may be used to isolate differing environments

3.1.3
matched glass to metal seal
a form of construction whereby the thermal expansion characteristics of the glass, the metallic contacts, and the connector shell are similar and the seal between the glass and the metal is formed by a chemical bond

3.1.4
compression glass to metal seal
a form of construction whereby due to the its higher coefficient of expansion the shell contracts around the glass during the solidification phase of manufacture applying a compression force to the glass insert so as to form a seal

3.2 Recommended method of termination

3.2.1 General

The contact terminations shall be of the following types: screw, crimp, insulation piercing, insulation displacement, press-in or solder. For the male connectors having a glass to metal seal the recommended contact terminations are crimp, eyelet, solder, PCB and rounded.

NOTE 1 eyelet – the termination end is flattened and pierced with a hole to provide both mechanical retention of the wire as well as solder attachment.

NOTE 2 rounded – terminal post with rounded (domed) end.

NOTE 3 PCB – termination spills suitable for insertion into printed circuits.

3.2.2 Number of contacts or contact cavities

A-coding	2 to 17 contacts
B-coding	5 contacts
C-coding	3 to 6 contacts
D-coding	4 contacts
P-coding	5 contacts (4+PE)

3.3 Ratings and characteristics

For the ratings, see Table 1.

Table 1 – Ratings of connectors

Coding	Style	Contacts	Rated voltage a.c. or d.c. V	Rated current A
A-coding	5 way	2 to 4	250	4
		5	60	
	8 way	6 to 8	30	2
	12 way	9 to 12	30	1,5
	17 way	13 to 17	30	1,5
B-coding	5 way	5	60	4
C-coding	3 way (2 + PE)	3 (2 + PE)	250	4
	4 way (3 + PE)	4 (3 + PE)	250	4
	5 way (4 + PE)	5 (4 + PE)	60	2
	6 way (5 + PE)	6 (5 + PE)	30	2
D-coding	4 way	4	250	4 [a]
P-coding	5 way (4 + PE)	5 (4 + PE)	60	4

[a] The M12 connectors with D-coding (4 way) are tested for use with frequencies up to 100 MHz.

Insulation resistance : 10^{8} Ω min.

Climatic category : see Table 6

Contact spacing : see Clause 5

3.4 Marking

The marking of the connector and the package shall be in accordance with 2.7 of IEC 61076-1.

3.5 Safety aspects

For safety aspects IEC 61984 shall be considered unless otherwise specified.

4 Dimensional information

4.1 General

Throughout this standard dimensions are in mm. Drawings are shown in the first angle projection. The shape of the connectors may deviate from those given in the following drawings as long as the specified dimensions are not influenced.

Missing dimensions shall be chosen according to common characteristics and intended use.

4.2 Survey of styles and variants

For all connector styles with cables, the length L of the cable shall be agreed between manufacturer and user. For connector styles with glass to metal seal the length E of the contacts shall be agreed between manufacturer and user.

For interface dimensions see 4.3.

The interface dimensions of the female styles shall be chosen according to the common characteristics of the male styles.

For reliable intermateability, the dimensions of the female connector body as detailed in Annex A have to be met.

4.2.1 Fixed connectors

Table 2 shows styles of fixed connectors.

Table 2 – Styles of fixed connectors

Style	Description
AM	Tube insert, male contacts, mounting without thread
BM	Tube insert, male contacts, mounting with thread M12 × 1
DM	Fixed connector, male contacts, mounting with thread M12 × 1, square flange front mounting
EM	Fixed connector, male contacts, mounting with thread M12 × 1, with wire ends, single hole mounting M16 × 1,5
FM	Fixed connector, male contacts, mounting with thread M12 × 1, with wire ends, single hole mounting M20 × 1,5
GM	Fixed connector, male contacts, mounting with thread M12 × 1, with wire ends, single hole mounting M16 × 1,5, mounting orientation
HM	Fixed connector, male contacts, mounting with thread M12 × 1, with wire ends, single hole mounting M20 × 1,5, mounting orientation
WM	Fixed connector, glass to metal seal, square flange front mounting, male contacts
XM	Fixed connector, glass to metal seal, single hole front mounting, male contacts
YM	Fixed connector, glass to metal seal, jam nut rear mounting, male contacts
ZM	Fixed connector, glass to metal seal, through flange mounting, male contacts
EF	Fixed connector, female contacts, with wire ends, single hole mounting M16 × 1,5
FF	Fixed connector, female contacts, with wire ends, single hole mounting M20 × 1,5
GF	Fixed connector, female contacts, with wire ends, single hole mounting M16 × 1,5, mounting orientation
HF	Fixed connector, female contacts, with wire ends, single hole mounting M20 × 1,5, mounting orientation
NOTE For new connectors according to this International Standard, Pg screw threads according to DIN 46320 (withdrawn) should not be applicable. For information on Pg threads, see Annex B.	

4.2.1.1 Style AM

Figure 1 shows a tube insert, with male contacts and a mounting with thread (thread on tube).

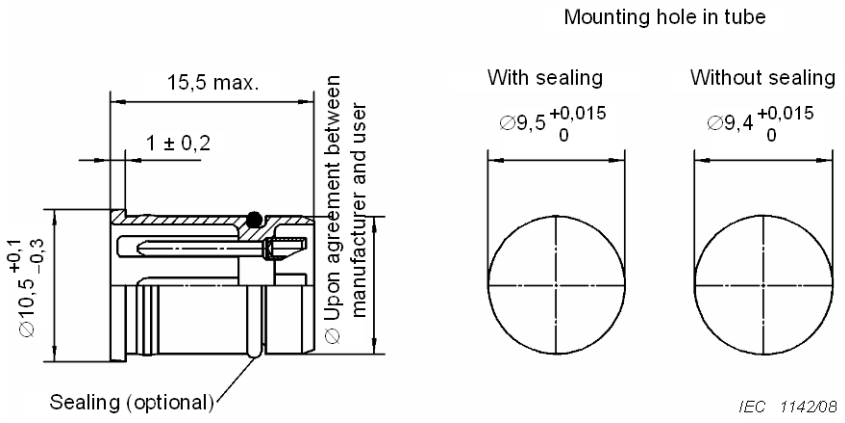


Figure 1 – Tube insert, male contacts, mounting without thread (thread on tube)

4.2.1.2 Style BM

Figure 2 shows a tube insert, with male contacts and a mounting with thread M12 × 1.

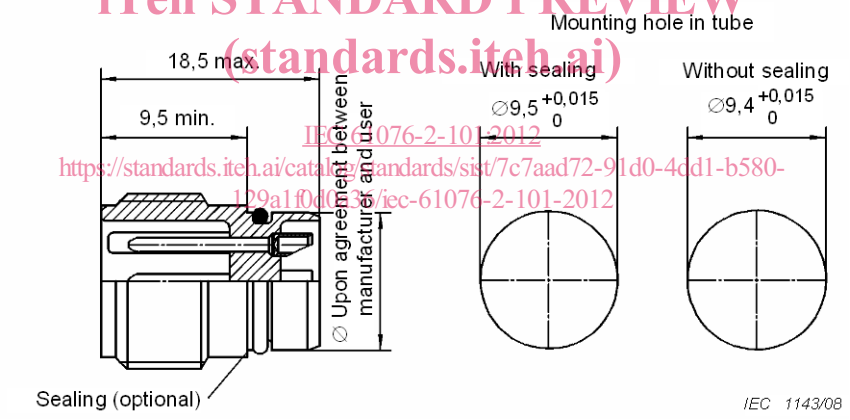


Figure 2 – Tube insert, male contacts, mounting with thread M12 × 1

4.2.1.3 Style DM

Figure 3 shows a fixed connector, with male contacts, mounting with thread M12 × 1 and a square flange front mounting.

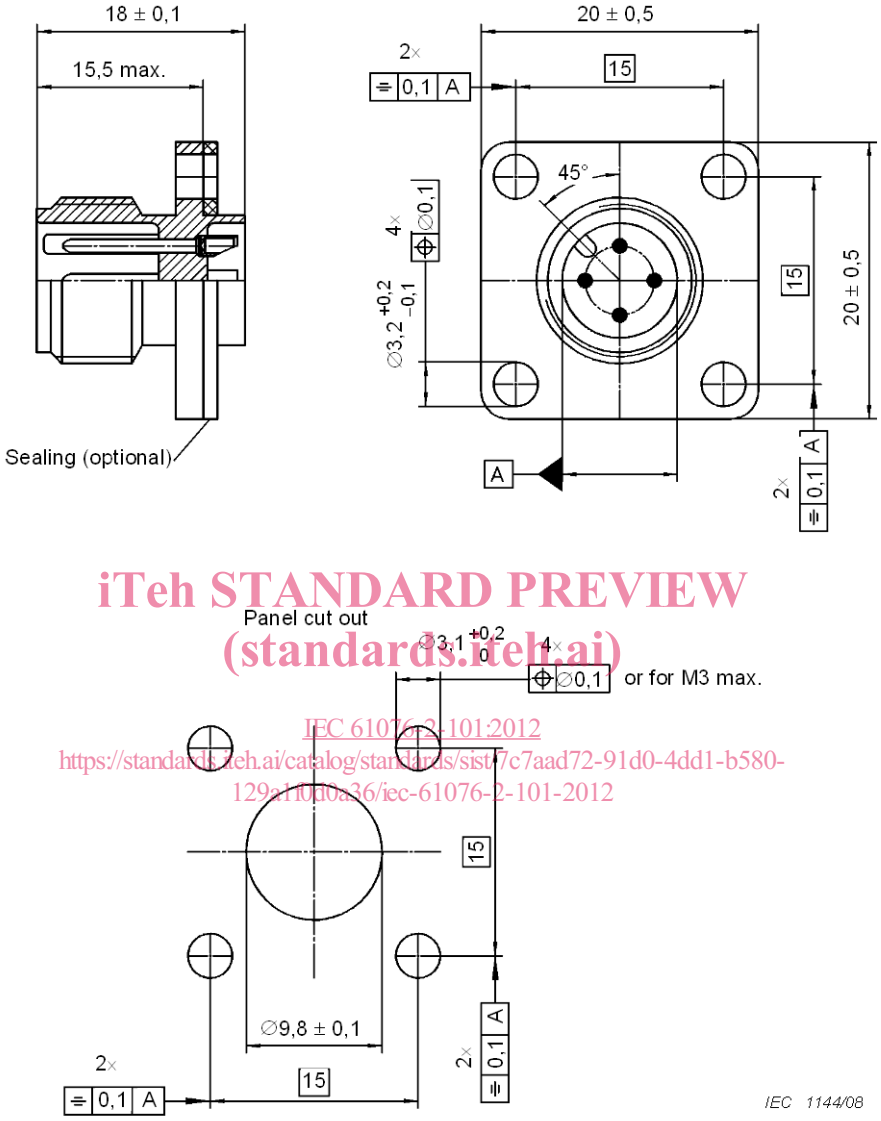


Figure 3 – Fixed connector, male contacts, mounting with thread M12 × 1, square flange front mounting