

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**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**

**Connecteurs pour équipements électroniques – Exigences de produit –
Partie 2-109: Connecteurs circulaires – Spécification particulière relative aux
connecteurs avec verrouillage à vis M 12 × 1, pour les transmissions de données
à des fréquences jusqu'à 500 MHz**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**CONNECTORS FOR ELECTRONIC EQUIPMENT –
PRODUCT REQUIREMENTS –**
**Part 2-109: Circular connectors – Detail specification for
connectors with M 12 x 1 screw-locking, for data
transmission frequencies up to 500 MHz**

FOREWORD

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International Standard IEC 61076-2-109 has been prepared by subcommittee 48B: Connectors, of IEC technical committee 48: Electromechanical components and mechanical structures for electronic equipment.

This first edition of IEC 61076-2-109 cancels and replaces IEC PAS 61076-2-109, published in 2010.

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

FDIS	Report on voting
48B/2369/FDIS	48B/2382/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.

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

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

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

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INTRODUCTION

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent concerning connector given in 4.3.2.

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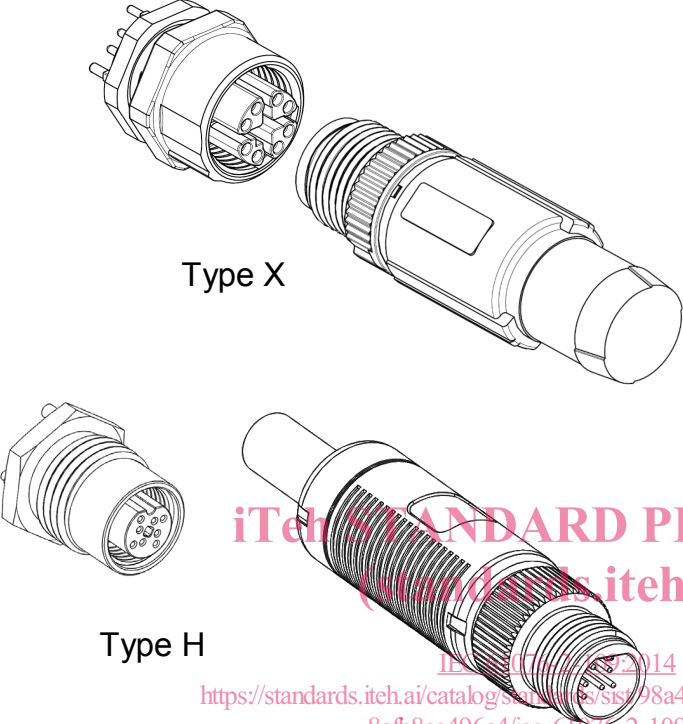
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<p>INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC SC 48B – Connectors</p>	<p>IEC 61076-2-109 Ed. 1.0</p>
<p>ELECTRONIC COMPONENTS in accordance with IEC 61076-1</p>	
 <p>Type X</p> <p>Type H</p> <p>STANDARD PREVIEW (standards.iteh.ai) IEC 61076-2-109:2014 https://standards.iteh.ai/catalog/standards/sist/98a435a3-bc4d-4f4d-9f46-8afb8ea496c4/iec-61076-2-109-2014 IEC 1225/14</p>	<p>Circular connectors M12 × 1 mm 2 to 8 ways, for data transmission frequencies up to 500 MHz</p> <p>Pin and socket connectors with round contact</p> <p>Rewireable – Non-rewirable</p> <p>Free cable connectors Straight and right angle connectors</p> <p>Fixed connectors Flange mounting Rear mounting Single hole mounting</p>

CONNECTORS FOR ELECTRONIC EQUIPMENT – PRODUCT REQUIREMENTS –

Part 2-109: Circular connectors – Detail specification for connectors with M 12 x 1 screw-locking, for data transmission frequencies up to 500 MHz

1 Scope

This part of IEC 61076 describes circular connectors with IP 65/IP 67 degree of protection and suitable for data transmission with frequencies up to 500 MHz. Applications include, but are not limited to, vision systems and data acquisition. These connectors consist of fixed and free connectors, either rewirable or non-rewirable, with M12 x 1 screw-locking. Male connectors have round contacts \varnothing 0,6 mm.

This standard covers two different types of connectors, denominated X and H, with different contact arrangement, not mutually interchangeable, but with common ratings and purposes.

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.

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IEC 60050 (all parts), *International Electrotechnical Vocabulary* (available at <http://www.electropedia.org>)

IEC 60068-1:2013, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-60:1995, *Environmental testing – Part 2: Tests – Test Ke: Flowing mixed gas corrosion test*

IEC 60352 (all parts), *Solderless connections*

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

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* (to be published)

IEC 60529:1989, *Degrés de protection procurés par les enveloppes (Code IP)*

Amendement 2:2013

Amendement 1:1999

IEC 60603-7:2008, *Connectors for electronic equipment – Part 7: Detail specification for 8-way, unshielded, free and fixed connectors*

Amendment 1:2011

IEC 60603-7-1, *Connectors for electronic equipment – Part 7-1: Detail specification for 8-way, shielded, free and fixed connectors*

IEC 60664-1:2007, *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 60999 (all parts), *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units*

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

IEC 61076-2:2011, *Connectors for electronic equipment – Product requirements – Part 2: Sectional specification for circular connectors*

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 61984:2008, *Connectors – Safety requirements and tests*

ISO 1302, *Geometrical Product Specifications (GPS) – Indication of surface texture in technical product documentation*

ISO 11801:2002, *Information technology – Generic cabling for customer premises*

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3 Technical information

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3.1 Terms and definitions [8afb8ea496c4/iec-61076-2-109-2014](#)

For the purposes of this document, the terms and definitions given in IEC 60050-581 apply.

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.

3.2.2 Number of contacts or contact cavities

2 to 8 contacts and 8 cavities.

Table 1 – Contact termination

Connector type	Number of contacts	Typical. termination
X	2 to 8	0,14 mm ² to 0,25 mm ² ^{a)}
H	2 to 8	0,14 mm ² to 0,25 mm ² ^{a)}

^{a)} Corresponds to AWG 26 to 24.

3.3 Ratings and characteristics

Rated voltage: 50 V a.c. / 60 V d.c., see 5.2.1, Table 7

Rated Current: 0,5 A, see 5.2.3

Insulation resistance: 10⁸ Ω, see 5.2.5

Climatic category: –25 °C / +85 °C / 21 days, see 5.1, Table 6

Contact spacing: see Clause 4

3.4 Marking

The marking of the connector and the package shall be in accordance with 2.6 of IEC 61076-2:2011.

3.5 Safety aspects

For safety aspects IEC 61984 shall be considered. In the sense of IEC 61984 this standard covers connectors without breaking capacity (COC).

4 Dimensions

4.1 General

All dimensions in mm are original. 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.

For connector dimensions, see 4.3.

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

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

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4.2 Survey of styles and variants

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Subclause 2.2 of IEC 61076-2-101:2012 applies.

4.3 Interface dimensions for connectors

4.3.1 Interface dimensions for connector type X

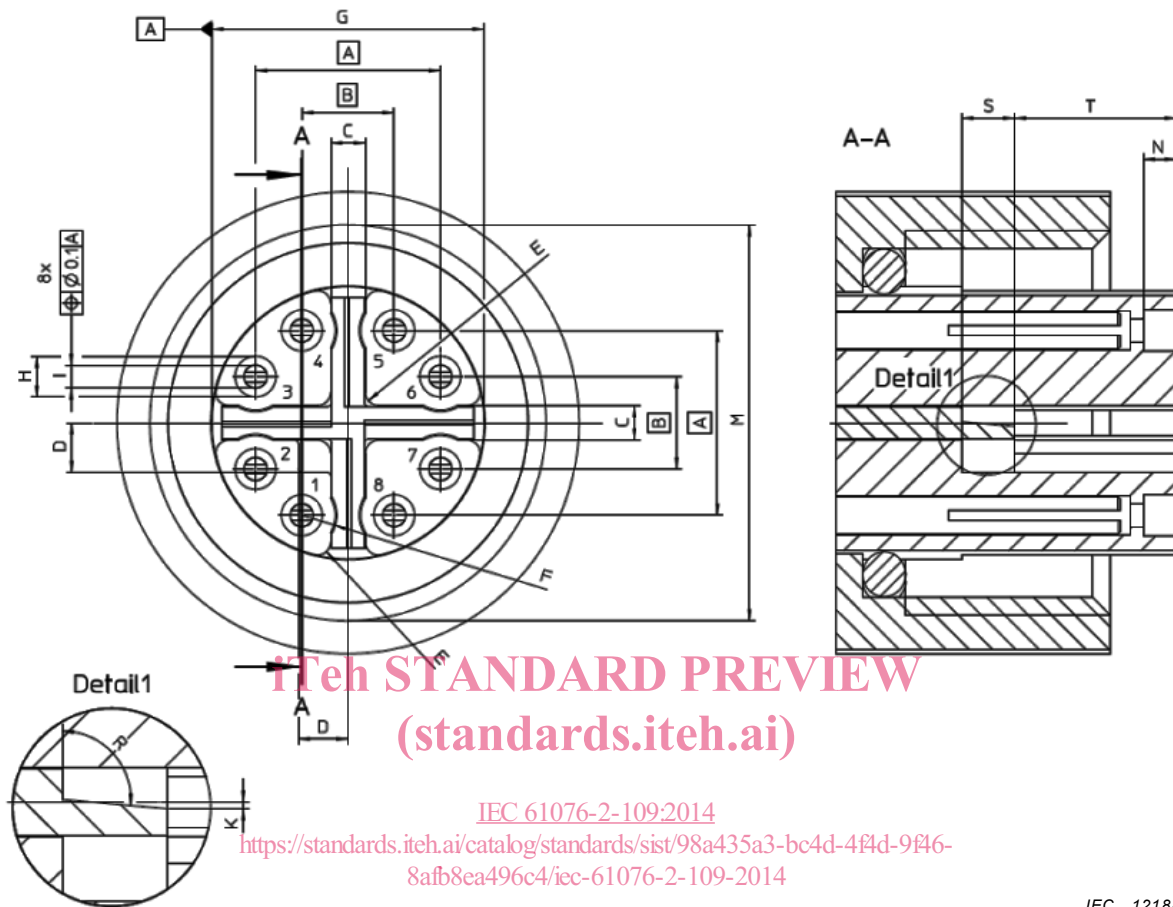


Figure 1 – Interface dimensions for connectors type X with female contacts

Table 2 – Interface dimensions, connector type X with female contacts

Reference	Minimum mm	Nominal mm	Maximum mm
A	5,6	5,6	5,6
B	2,8	2,8	2,8
C	1,05	1,05	1,1
D	1,5	1,5	1,6
E	0,4	0,4	0,5
F	0,96	1,02	1,02
G	8,15	8,25	8,25
H	1,24	1,24	1,34
I	0,7	0,7	0,75
K	0,1	0,1	0,15
M	M12x1		
N	1	1	1,1
R	94,5°	95°	95°
S	1,6	1,6	1,7
T	4,7	4,9	5,1

NOTE All radii without dimensions are 0,1

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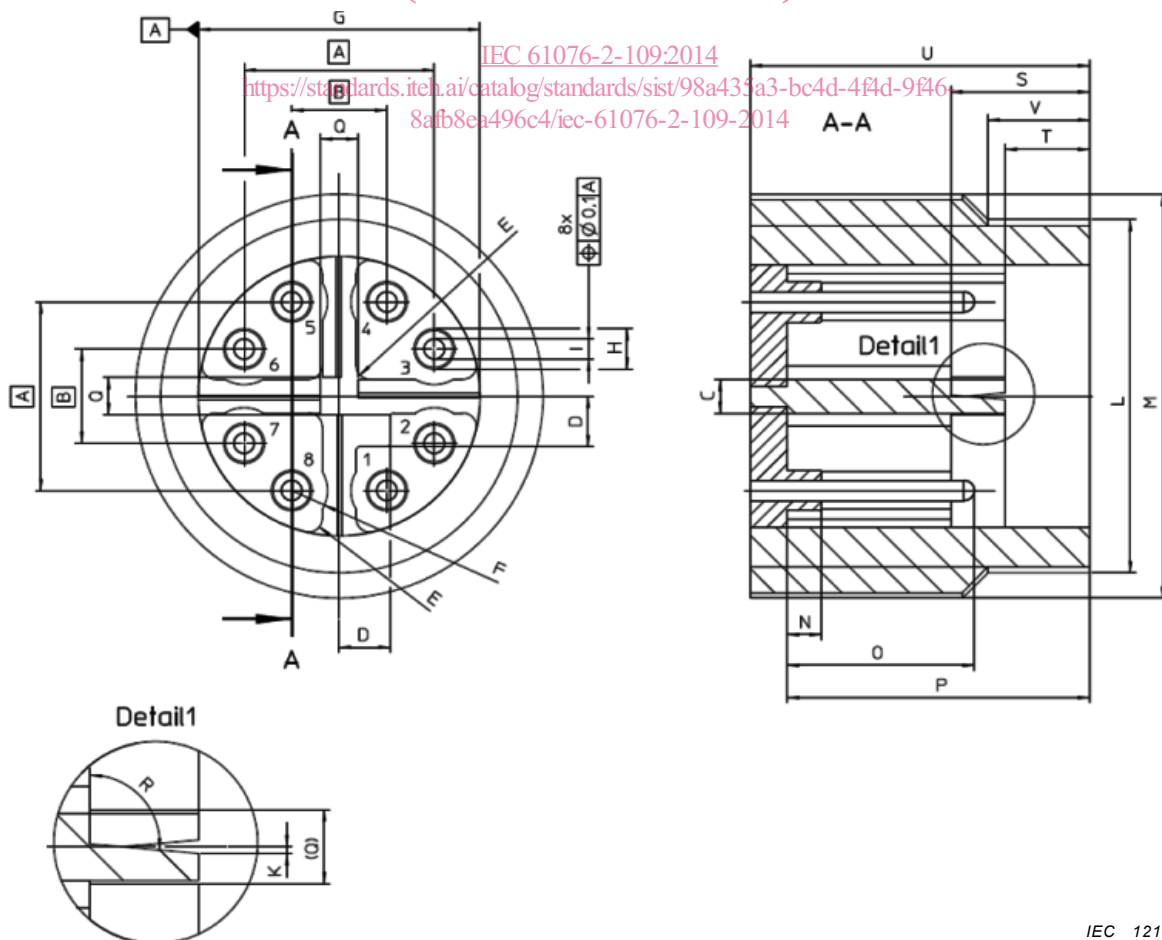


Figure 2 – Interface dimensions for connectors type X with male contacts

Table 3 – Interface dimensions, connector type X with male contacts

Reference	Minimum mm	Nominal mm	Maximum mm
A	5,6	5,6	5,6
B	2,8	2,8	2,8
C	0,9	1	1
D	1,4	1,5	1,5
E	0,3	0,4	0,4
F	1,06	1,06	1,11
G	8,3	8,3	8,45
H	1,1	1,2	1,2
I	0,57	0,6	0,63
K	0,07	0,1	0,13
L	10,2	10,5	10,5
M	M12x1		
N	0,9	1	1
O	5,3	5,5	5,7
P	8,7	8,9	8,9
Q	1,1	1,1	1,2
R	94,5°	95°	95°
S	4,1	4,1	4,2
T	2,5	2,5	2,6
U	10		
V			3

NOTE All radii without dimensions are 0,1.