

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Connectors for electrical and electronic equipment –
Part 5: Detail specification for 2-way M8 and M12 circular connectors, shielded
or unshielded, free and fixed – Mechanical mating information, pin assignment
and additional requirements for Type 5**

[IEC 63171-5:2022](#)

**Connecteurs pour équipements électriques et électroniques –
Partie 5: Spécification particulière pour les connecteurs circulaires M8 et M12 à
2 pôles, à fiches et embases écrantées ou non écrantées – Informations
d'accouplement mécanique, affectation des broches et exigences
supplémentaires pour le type 5**



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CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT –**Part 5: Detail specification for 2-way M8 and M12 circular connectors, shielded or unshielded, free and fixed – Mechanical mating information, pin assignment and additional requirements for Type 5**

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IEC 63171-5 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.

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

Draft	Report on voting
48B/2973/FDIS	48B/2983/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 of IEC 63171 series, under the general title *Connectors for electrical and electronic equipment*, 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,
- withdrawn,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

IEC 63171 is the base specification of the whole series. Subsequent specifications do not duplicate information given in the base document, but list only additional requirements. For complete specification regarding a component of a higher number document all lower numbered documents shall be considered as well. Figure 1 shows the interrelation of the documents.

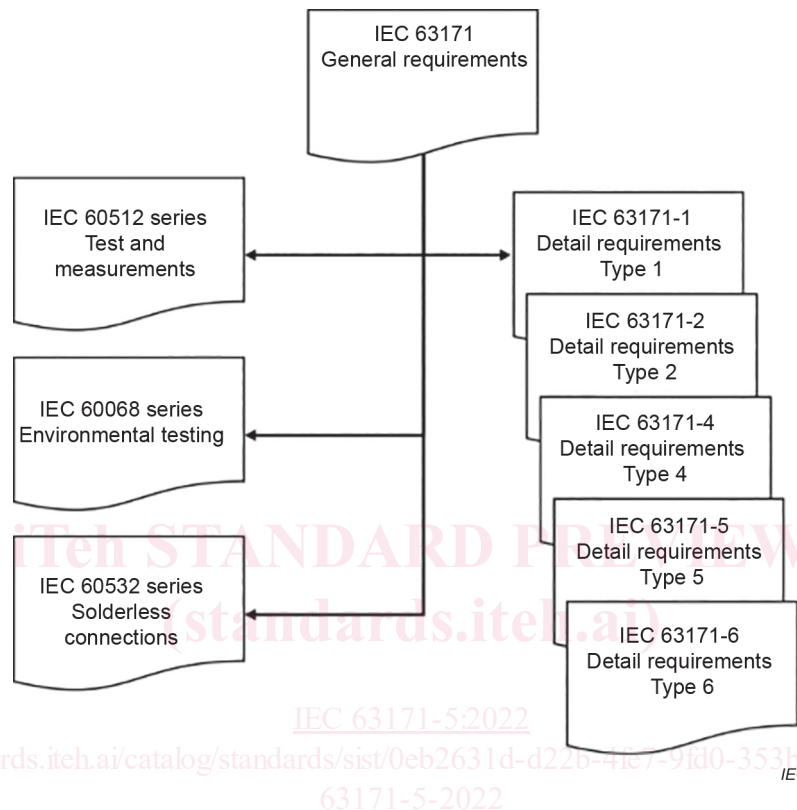

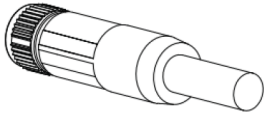

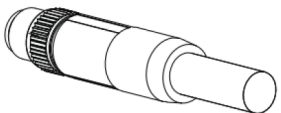

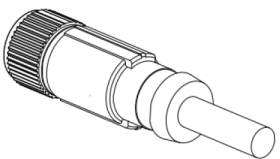

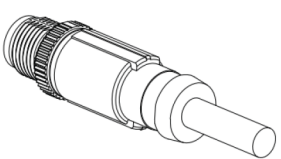


Figure 1 – Relationships between the IEC 63171 series documents and their related references

NOTE IEC 63171-1 and IEC 63171-6 contain duplicate information, which is either equal to or better than the minimum requirements of this document; such duplicate information will be removed in later editions.

This document refers to International Standards for test and measurement, environmental testing as well as solderless connections.

A general overview about the connectors in this document is shown in Figure 2.

<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 63171-5 Ed. 1</p>
  <p>Fixed connector: M8 outer thread and male contacts Free connector: M8 inner thread and female contacts</p>	  <p>Fixed connector: M8 inner thread and female contacts Free connector: M8 outer thread and male contacts</p>	<p>Circular connectors for data and power applications with 2 ways in a M8 and in a M12 style system</p> <p>Male and female connectors Male and female contacts</p> <p>Rewireable – Non-rewireable</p>
  <p>Fixed connector: M12 outer thread and male contacts Free connector: M12 inner thread and female contacts</p>	  <p>Fixed connector: M12 inner thread and female contacts Free connector: M12 outer thread and male contacts</p>	<p>Free cable connectors Straight and angled connectors</p> <p>Fixed connectors Flange mounting Single hole mounting</p>

IEC 63171-5:2022

<https://standards.iteh.ai/cs/9fd0-353b546e8287/iec-63171-5-2022> **Figure 2 – Type 5 connector overview**

CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT –

Part 5: Detail specification for 2-way M8 and M12 circular connectors, shielded or unshielded, free and fixed – Mechanical mating information, pin assignment and additional requirements for Type 5

1 Scope

This part of IEC 63171 describes 2-way shielded or unshielded circular connectors with IP65/IP67 M8 or M12 locking, typically used for balanced single-pair data transmission with frequencies up to 600 MHz and with current-carrying capacity up to 4 A, for use in areas with harsh environmental conditions.

These connectors consist of fixed and free connectors, either rewirable or non-rewirable. Male connectors have square cross-section contacts.

M12 describes the dimensions of the styles and thread of the screw-locking mechanism according to IEC 61076-2-101 of this size of circular connectors. M8 describes the dimensions of the styles and thread of the screw-locking mechanism according to IEC 61076-2-104.

Use of alternative locking mechanisms according to IEC 61076-2-010 (push-pull locking) or IEC 61076-2-011 (bayonet locking) is possible, within the corresponding size.

The coding provided by this document prevents the mating of accordingly coded male or female connectors to other similarly sized interfaces covered by this or other documents.

<https://standards.iteh.ai/catalog/standards/sist/0eb2631d-d22b-4fe7-9fd0-353b546e8287/iec-63171-5-2022>
This document covers Type 5 connectors. Each part of this series has the associated type number equal to the number of the part in the series. All connectors in the IEC 63171 series are deemed to provide the same functions as defined in IEC 63171:2021, using different mechanical interfaces.

These Type 5 connectors are interoperable with Type 2 connectors according to IEC 63171-2, except the locking and sealing system provided by the outer shell.

The shielded and unshielded connectors are interoperable for their internal transmission performance and can be exchanged. The shielded version has improved EMC and coupling properties.

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 (IEV) – Part 581: Electromechanical components for electronic equipment*

IEC 60352 (all parts), *Solderless connections*

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

IEC 60512-28-100:2019, *Connectors for electrical and electronic equipment – Tests and measurements – Part 28-100: Signal integrity tests up to 2 000 MHz – Tests 28a to 28g*

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

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

IEC 61076-2-104, *Connectors for electronic equipment – Product requirements – Part 2-104: Circular connectors – Detail specification for circular connectors with M8 screw-locking or snap-locking*

IEC 61760-3, *Surface mounting technology – Part 3: Standard method for the specification of components for through hole reflow (THR) soldering*

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

IEC 63171:2021, *Connectors for electrical and electronic equipment – Shielded or unshielded free and fixed connectors for balanced single-pair data transmission with current carrying capacity – General requirements and tests*

IEC 63171-2, *Connectors for electrical and electronic equipment – Part 2: Detail specification for 2-way, shielded or unshielded, free and fixed connectors – Mechanical mating information, pin assignment and additional requirements for Type 2*

ISO/IEC 11801-1, *Information technology – Generic cabling for customer premises – Part 1: General requirements*

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

IEEE 802.3, *IEEE Standard for Ethernet*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 63171:2021, IEC 60050-581, and IEC 60512-1 apply, as well as 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 cable entry direction and the polarization keyway should be specified.

4 Common features and typical connector pair

4.1 Systems of levels

4.1.1 Performance levels

According to 6.6.1.

4.1.2 Compatibility levels, according to IEC 61076-1

Connectors according to this document are intermatable according to IEC 61076-1.

Connectors according to this document are intermatable with connectors IEC 63171-2 according to IEC 61076-1, the resulting mated set being characterized by the IP20 degree of protection of the I₁ ingress protection of IEC 63171-2 connectors.

4.2 Pin assignment

Connectors according to this document are foreseen with the following assignments:

M8: 2 ways, see Annex A.

M12: 2 ways, see Annex B.

4.3 Codings

M12 connectors according to this document are foreseen with the following codings, see 5.8, Figure 8 – male connectors – and Figure 9 – female connectors – for details:

SPE1

SPE2

The number and shape of contacts and all performance characteristics are identical.

4.4 Classification into climatic categories

Classification into climatic categories is specified in 6.3.

4.5 Creepage and clearance distances

See 6.4.1.

4.6 Current-carrying capacity

According to Level II of 5.4.3 of IEC 63171:2021.

4.7 Marking

The marking of the connector and the package shall be in accordance with 2.7 of IEC 61076-1:2006.

4.8 Characteristics

Required arrangements for the connectors can be found in Annex A and Annex B.

5 Dimensional information

5.1 General

Throughout this document, 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 for the styles are shown in IEC 61076-2-101 and IEC 61076-2-104.

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

5.2 Isometric view and common features

5.2.1 General

For interface dimensions see 5.6, 5.7, 5.8 and 5.9.

5.2.2 Common features

Not applicable.

5.2.3 Reference system

Not applicable.

5.3 Engagement (mating) information – Engaging (mating) direction

Arrows in Figure 3 indicate the mating direction.

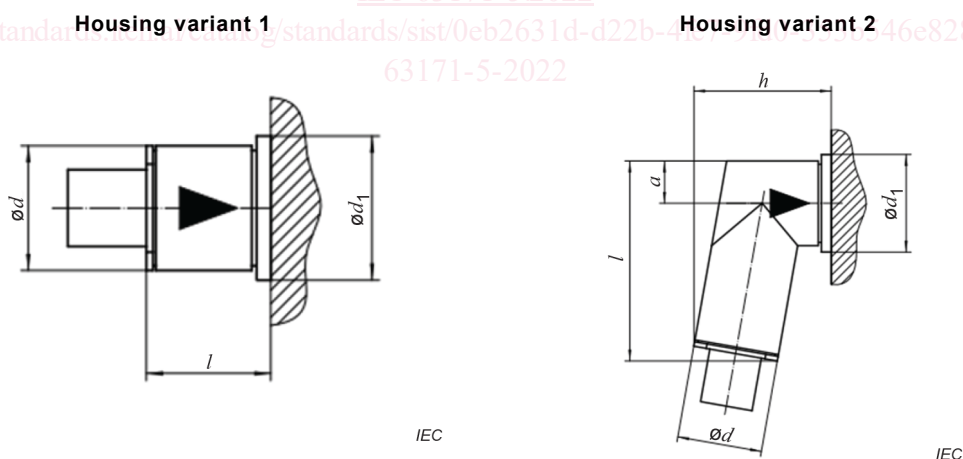


Figure 3 – Engagement (mating) information

All dimensions for mated and locked position for the M8 style connectors are according to IEC 61076-2-104.

All dimensions for mated and locked position for the M12 style connectors are according to IEC 61076-2-101.

5.4 Fixed connectors

5.4.1 Overview about styles for fixed connectors

All styles of 61076-2-104 can be used for the fixed M8 style connectors.

All styles of 61076-2-101 can be used for the fixed M12 style connectors, except for WM, XM, YM and ZM.

5.4.2 Interface dimensions – Fixed connectors M8

All implementations of 5.6 and 5.7 can be used for the fixed M8 style connectors.

5.4.3 Interface dimensions – Fixed connectors M12

All implementations of 5.8 and 5.9 can be used for the fixed M12 style connectors.

5.5 Free connectors

5.5.1 Overview about styles for free connectors

All styles of 61076-2-104 can be used for the free M8 style connectors.

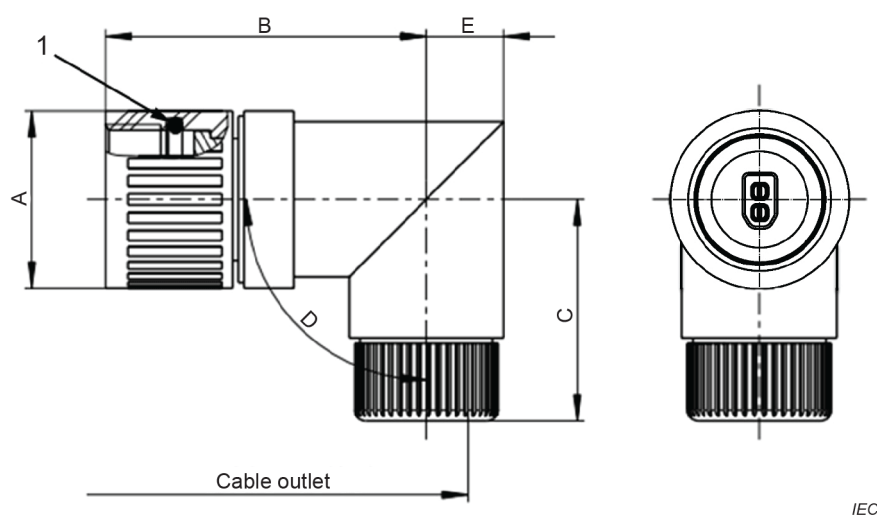
All styles of 61076-2-101 can be used for the free M12 style connectors.

Angled styles KF and MF are shown only for the orientation of the mating face relative to the outer shell.

Locking nut with knurled ring or hexagonal ring upon agreement.

5.5.2 Style KF

Figure 4 shows style KF and Table 1 shows the dimensions for style KF.



Key

1 Sealing

Figure 4 – Free connector style KF