IEC 63171-1

Edition 1.0 2020-04

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Connectors for electrical and electronic equipment –
Part 1: Detail specification for two-way, shielded or unshielded, free and fixed connectors – Mechanical mating information, pin assignment and additional requirements for Type 1 copper LC style

Connecteurs pour équipements électriques et électroniques –
Partie 1: Spécification particulière pour les fiches et les embases bidirectionnelles, écrantées ou non écrantées – Informations sur l'accouplement mécanique, brochage et exigences supplémentaires pour connecteur LC de type 1 à doigts de guidage en cuivre

IEC 63171-1:2020-04(en-fr)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,…). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary
67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

A propos de l'IEC
La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC
Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC - webstore.iec.ch/advsearchform
La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,…). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished
Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc
Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

Electropedia - www.electropedia.org
Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary
67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

IEC 63171-1

Edition 1.0 2020-04

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Connectors for electrical and electronic equipment –
Part 1: Detail specification for two-way, shielded or unshielded, free and fixed connectors – Mechanical mating information, pin assignment and additional requirements for Type 1 copper LC style**

**Connecteurs pour équipements électriques et électroniques –
Partie 1: Spécification particulière pour les fiches et les embases bidirectionnelles, écrantées ou non écrantées – Informations sur l'accouplement mécanique, brochage et exigences supplémentaires pour connecteur LC de type 1 à doigts de guidage en cuivre**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 31.220.10

ISBN 978-2-8322-8076-8

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

____

CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT –

Part 1: Detail specification for two-way, shielded or unshielded, free and fixed connectors – Mechanical mating information, pin assignment and additional requirements for Type 1 copper LC style

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.

3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.

4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.

5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.

6) All users should ensure that they have the latest edition of this publication.

7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.

8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 63171-1 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/2783/FDIS	48B/2799/RVD

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

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

A list of all parts in the IEC 63171 series, published under the general title *Connectors for electrical and electronic components*, 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 "http://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.

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 contact mating surface dimensions given in 5.1.

The IEC takes no position concerning the evidence, validity and scope of this patent right.

The holder of the patent right on contact mating surface dimensions in 5.1 has assured the IEC that they are willing to give free licences to applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with the IEC

Information may be obtained from:

CommScope Technologies, LLC

501 Shenandoah Drive

Shakopee, Minnesota

USA 55379

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights other than those identified above. IEC shall not be held responsible for identifying any or all such patent rights.

ISO (www.iso.org/patents) and IEC (http://patents.iec.ch) maintain on-line data bases of patents relevant to their standards. Users are encouraged to consult the data bases for the most up to date information concerning patents.

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 the base numbered documents should be considered as well. The following diagram (see Figure 1) shows the interrelation of the documents:

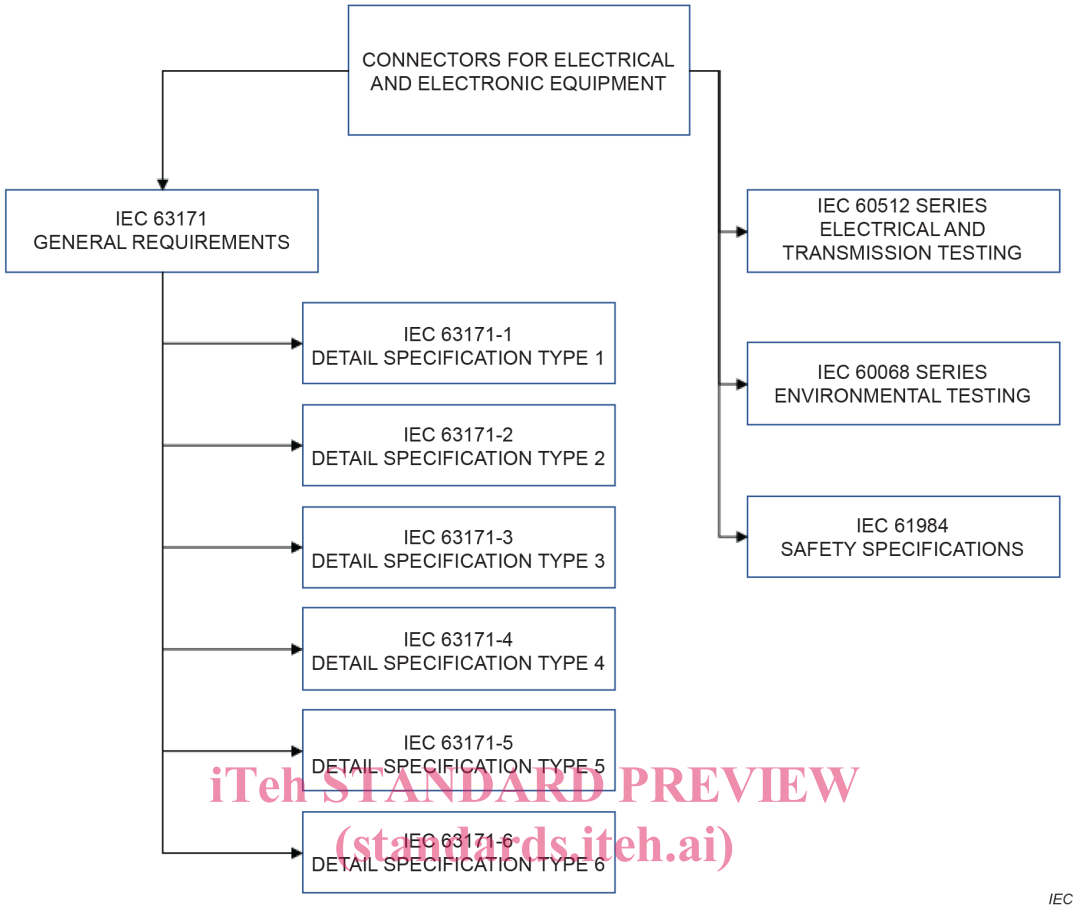
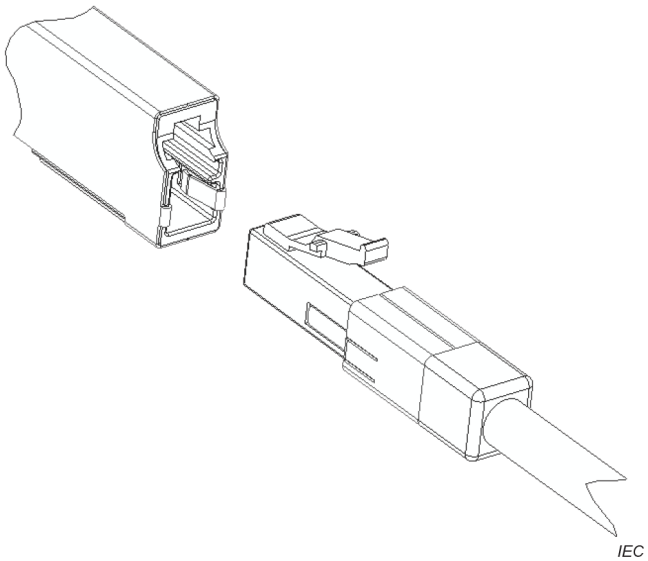


Figure 1 – Relationships between the IEC 63171 series and its related references

International Electrotechnical Commission

IEC 63171-1 Ed1

Subcommittee 48B: Electrical connectors



View showing typical fixed and free connectors

Two-way, free and fixed connectors for data transmission up to 600 MHz (and with current carrying capacity up to 2,0 A at 60° C.)

Fixed connectors are mounted on printed circuit board or bulk head, the free connector is terminated on shielded or unshielded wire.

Figure 2 – Connector overview

CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT –

Part 1: Detail specification for two-way, shielded or unshielded, free and fixed connectors – Mechanical mating information, pin assignment and additional requirements for Type 1 copper LC style

1 Scope

This part of IEC 63171 covers two-way, shielded or unshielded, free and fixed connectors for data transmission with frequencies up to 600 MHz and with current carrying capacity up to 2,0 A at 60 °C. It is intended to specify the common dimensions, mechanical, electrical, signal integrity, environmental characteristics, reliability specifications and corresponding tests for these connectors.

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 reference document (including any amendments) applies.

IEC 60050-581, *International Electrotechnical Vocabulary (IEV) – Chapter 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 60512-1-1, *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 60512-2-1, *Connectors for electronic equipment – Tests and measurements – Part 2-1: Electrical continuity and contact resistance tests – Test 2a: Contact resistance – Millivolt level method*

IEC 60512-2-5, *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 60512-5-2, *Connectors for electronic equipment – Tests and measurements – Part 5-2: Current-carrying capacity tests – Test 5b: Current-temperature derating*

IEC 60512-6-4, *Connectors for electronic equipment – Tests and measurements – Part 6: Dynamic stress tests – Section 5: 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 60512-11-7, *Connectors for electronic equipment – Tests and measurements – Part 11-7: Climatic tests – Test 11g: Flowing mixed gas corrosion test*

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

IEC 60512-25-9, *Connectors for electronic equipment – Tests and measurements – Part 25-9: Signal integrity tests – Test 25i: Alien crosstalk*

IEC 60512-26-100, *Connectors for electronic equipment – Tests and measurements – Part 26-100: Measurement setup, test and reference arrangements and measurements for connectors according to IEC 60603-7 – Tests 26a to 26g*

IEC 60512-28-100, *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 systems – Part 1: Principles, requirements and tests*

IEC 62153-4-12, *Metallic communication cable test methods – Part 4-12: Electromagnetic compatibility (EMC) – Coupling attenuation or screening attenuation of connecting hardware – Absorbing clamp method*

IEC 62153-4-15, *Metallic communication cable test methods – Part 4-15: Electromagnetic compatibility (EMC) – Test method for measuring transfer impedance and screening attenuation – or coupling attenuation with triaxial cell*

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

3 Terms and definitions

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

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

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

4 Technical information

4.1 Compatibility level – Interoperability

Interoperability of connectors from different sources that are in compliance to this document is assured as a pre-requisite by compliance with the specified interface dimensions (intermateability) and by the relevant signal integrity tests specified.

The design of this copper LC style connector contains features in both the free and fixed connectors that prevent intermateability with a standard LC fibre optic connector according to IEC 61754-20. The key feature in the fixed connector, as shown in Figure 4c), prevents the insertion of an LC fibre optic connector. The height of the free connector, shown in Figure 6b) (dimension AY) prevents insertion into an LC fibre optic outlet.

4.2 Unshielded connectors

This document is focused on shielded connectors to cover a broad set of use cases and environments. Unshielded connectors can be qualified using this document for use cases where the requirements for alien crosstalk or external noise mitigation is not as stringent. Such unshielded connectors shall conform to the specified fixed and free connector mating dimensions of shielded connectors in Figure 4 and Figure 6 (except for dimensions R, S, T and AN from Figure 4, and AU, AV, and AW from Figure 6 as they are related only to shield features). Unshielded connectors shall comply with IL, RL, TCL, and TCTL transmission requirements in Clause 6 and indicate in their data sheets specific requirements of IEC 63171-1 to which they comply.

4.3 Use of UTP cable

Shielded connectors can be used with UTP cables for those use cases where channel/link alien crosstalk requirements are less stringent, complying with application specific (e.g. IEEE 802.3) or generic cabling standards (e.g. ISO 11801 series).

5 Common features and typical connector pair

5.1 Mating information

5.1.1 General

Dimensions are given in millimeters. Drawings are shown in third-angle projection. The shape of connectors may deviate from those given in Figure 2 to Figure 6 as long as the dimensions specified are not changed (see also Table 1 to Table 3).

5.1.2 Contacts – Mating conditions

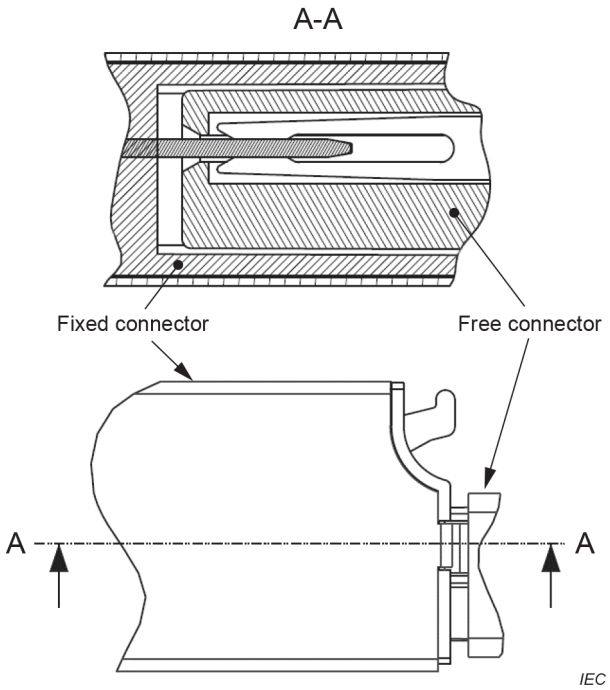
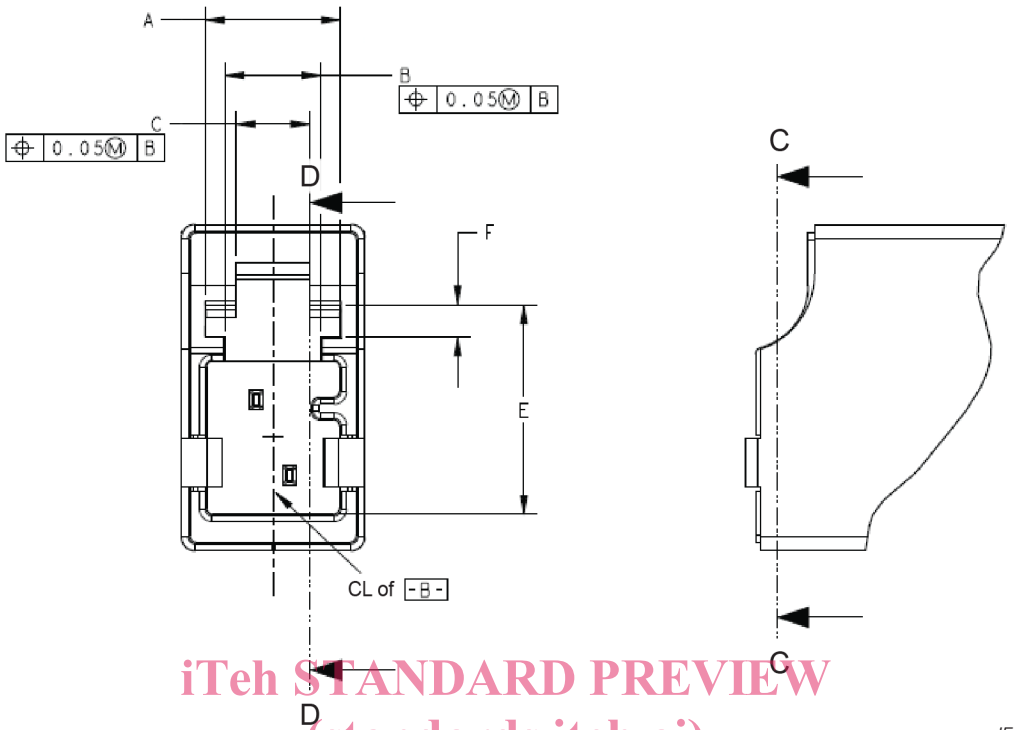


Figure 3 – Mated fixed and free connectors

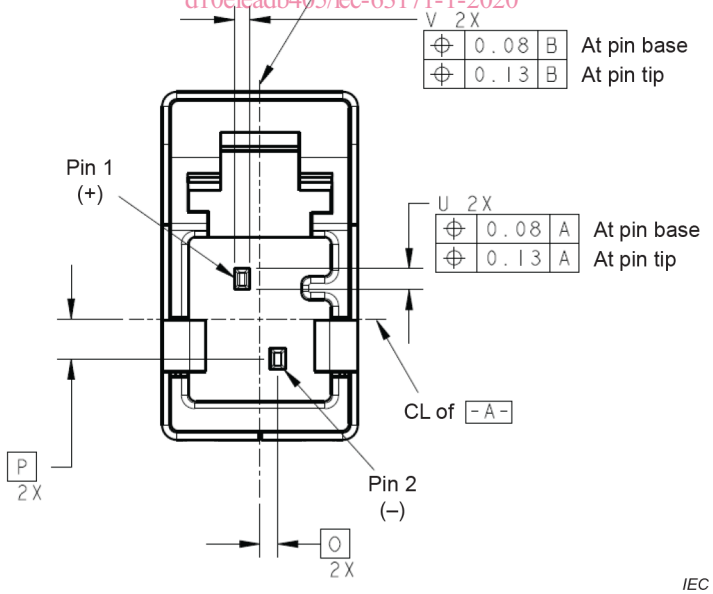
5.1.3 Fixed connector

Dimensions in mm



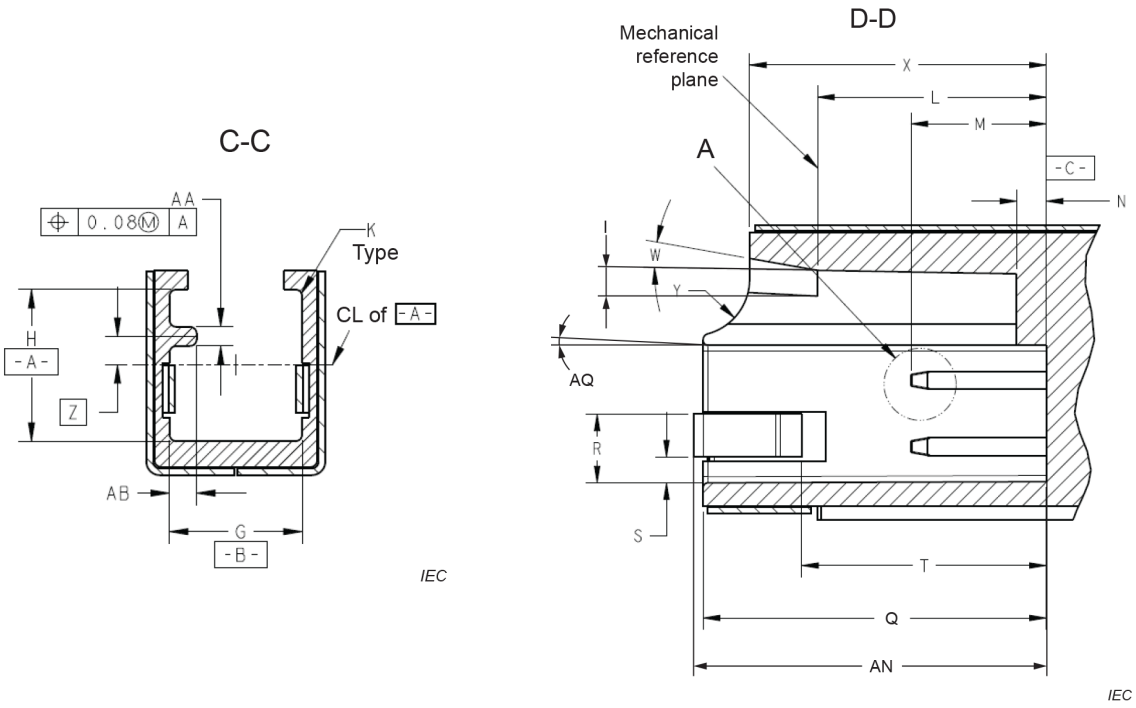
IEC

a) – Fixed connector



IEC

b) – Pin detail



c) – Section views of fixed connector

Figure 4 – Fixed connector

Table 1 – Dimensions for Figure 4a), Figure 4b) and Figure 4c)

Dimensions in mm

Reference	Dimensions			Notes
	Minimum	Nominal	Maximum	
A	4,5	4,8	-	
B	3,4	3,45	3,5	
C	2,6	2,65	2,7	
D	[a]			
E	7,55	7,6	7,65	
F	1,1	1,15	1,2	
G	4,65	4,7	4,75	
H	5,55	5,6	5,65	
I	1,0	1,05	1,1	-
J	0,3	-	-	Radius
K			0,3	Radius
L	9,2	9,3	9,4	
M	5,4	5,5	5,6	
N	1,1	1,2	1,3	
O		0,6		Basic dimension
P		1,35		Basic dimension
Q	13,85	13,95	14,05	
R		-	2.7	Shield contact area*
S	1,2	-		Shield contact area*
T	-	-	10	Shield contact area*