

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Connectors for electronic equipment – Product requirements –
Part 3-110: Rectangular connectors – Detail specification for shielded, free and
fixed connectors for data transmission with frequencies up to 1 000 MHz**

**Connecteurs pour équipements électroniques – Exigences de produit –
Partie 3-110: Connecteurs rectangulaires – Spécification particulière pour les
fiches et les embases écrantées pour la transmission de données à des
fréquences jusqu'à 1 000 MHz**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

CONNECTORS FOR ELECTRONIC EQUIPMENT – PRODUCT REQUIREMENTS –

Part 3-110: Rectangular connectors – Detail specification for shielded, free and fixed connectors for data transmission with frequencies up to 1 000 MHz

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International Standard IEC 61076-3-110 has been prepared by subcommittee 48B: Connectors, of IEC technical committee 48: Electromechanical components and mechanical structures for electronic equipment.

This International Standard cancels and replaces IEC/PAS 61076-3-110 (2002).

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

FDIS	Report on voting
48B/1796/FDIS	48B/1827/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.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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- withdrawn,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.

Withdrawn

INTRODUCTION

This part of IEC 61076 describes connectors according to IEC 61076-3 series connectors requirements.

The connectors are similar to and compatible with IEC 60603-7 series connectors.

The IEC 61076-3-110 free connector can be used in data communication cabling systems with the IEC 60603-7-7 and IEC 60603-7-71 fixed connector.

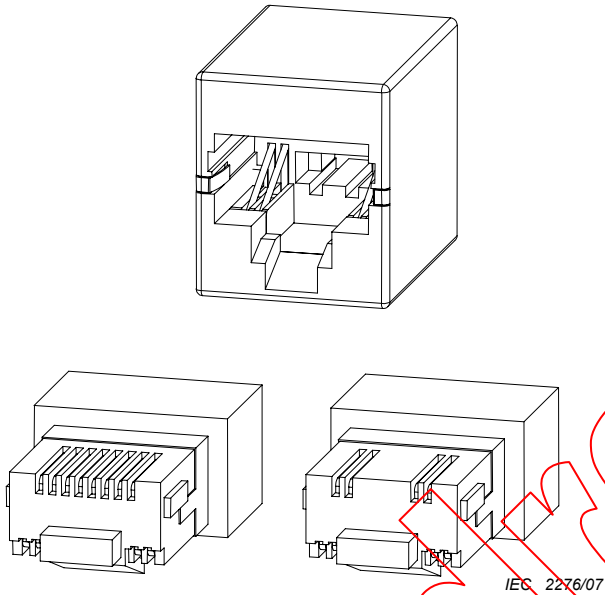
The IEC 61076-3-110 connector includes up to 12 contacts, including up to 8 contacts (1,2,3,4,5,6,7,8) that are similar to a standard IEC 60603-7 series connector. In addition, the IEC 61076-3-110 connector includes up to 4 additional contacts (6',3',4',5') located on the opposite side from the original contact positions of a basic IEC 60603-7 series connector.

For use in high speed communications cabling systems, IEC 60603-7-7 and IEC 60603-7-71 fixed connectors include a switch or other means to engage these two different sets of four contacts to enable backward compatibility for transmission performance. In this application the IEC 61076-3-110 free connector simply uses 8 contacts (1,2,3',4',5',6',7,8) and no switch.

The IEC 61076-3-110 fixed connector includes a board mounted style in addition to the cable mounted style.

The complete requirements for the connectors described in this specification correspond to this detail specification and the current issues of IEC 61076-3 and IEC 60603-7 series, which are referenced herein accordingly.

Withhold

IEC SC 48B: CONNECTORS Specification available from: IEC Central Office or from the addresses shown on the inside cover	IEC 61076-3-110
	Detail specification for two-part connector used in:
	– high speed communications applications up to 1 000 MHz – up to 6 balanced contact pairs (up to 12 contacts) – compatible with IEC 60603-7 series connectors 4 balanced contact pairs (1,2,3,4,5,6,7,8) up to 500 MHz and 4 balanced contact pairs (1,2,3',4',5',6',7,8) of IEC 60603-7-7 up to 600 MHz and IEC 60603-7-71 up to 1 000 MHz – intended for inside-building cabling systems
	Fixed connector: cable mount or for mounting on printed boards
	Free connector: cable mount only
	Performance level(s): 1, 2
	Assessment level(s): not specified
	Reference data: not available

CONNECTORS FOR ELECTRONIC EQUIPMENT – PRODUCT REQUIREMENTS –

Part 3-110: Rectangular connectors – Detail specification for shielded, free and fixed connectors for data transmission with frequencies up to 1 000 MHz

1 General

1.1 Scope

This part of IEC 61076 is a detail specification, forming part of IEC 61076-3, for IEC 61076-3-110, two-part connector.

It covers mechanical and environmental requirements, and electrical transmission requirements for frequencies up to 1 000 MHz.

These connectors can be used as category 7 connectors in class F cabling systems, as specified in ISO/IEC 11801:2002.¹

The connectors are intermateable with IEC 60603-7-X series connectors.²

The connectors are interoperable with IEC 60603-7-7 and IEC 60603-7-71 connectors.³

The connectors are backward compatible with IEC 60603-7-7 and IEC 60603-7-71 connectors.⁴

1.2 Normative references

The following referenced documents are indispensable for the application 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 60068-1, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-38, *Environmental testing – Part 2-38: Tests – Test Z/AD: Composite temperature/humidity cyclic test*

IEC 60352 (all parts), *Solderless connections*

IEC 60352-2, *Solderless connections – Part 2: Crimped connections – General requirements, test methods and practical guidance*

IEC 60352-3, *Solderless connections – Part 3: Solderless accessible insulation displacement connections – General requirements, test methods and practical guidance*

IEC 60352-4, *Solderless connections – Part 4: Solderless non-accessible insulation displacement connections – General requirements, test methods and practical guidance*

¹ ISO/IEC 11801 contains various 'category' designations corresponding to various frequency ranges.

² Intermateability definition and requirements are given in 2.2.2.

³ Interoperability definition and requirements are given in 2.2.3.

⁴ Backward compatibility definition and requirements are given in 2.2.4.

IEC 60352-5, *Solderless connections – Part 5: Press-in connections – General requirements, test methods and practical guidance*

IEC 60352-6, *Solderless connections – Part 6: Insulation piercing connections – General requirements, test methods and practical guidance*

IEC 60352-7, *Solderless connections – Part 7: Spring clamp connections – General requirements, test methods and practical guidance*

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 60603-7 (all parts), *Connectors for frequencies below 3 MHz for use with printed boards – Part 7: Detail specification for connectors, 8-way, including fixed and free connectors with common mating features, with assessed quality*

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

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

IEC 61076-3, *Connectors for electronic equipment – Product requirements – Part 3: Rectangular connectors with assessed quality – Sectional specification⁵*

IEC 61156 (all parts), *Multicore and symmetrical pair/quad cables for digital communications*

IEC 61156-2, *Multicore and symmetrical pair/quad cables for digital communications – Part 2: Horizontal floor wiring – Sectional specification*

IEC 61156-3, *Multicore and symmetrical pair/quad cables for digital communications – Part 3: Work area wiring – Sectional specification*

IEC 61156-4, *Multicore and symmetrical pair/quad cables for digital communications – Part 4: Riser cables – Sectional specification*

IEC 61156-5, *Multicore and symmetrical pair/quad cables for digital communications – Part 5: Symmetrical pair/quad cables with transmission characteristics up to 600 MHz – Horizontal floor wiring – Sectional specification*

IEC 61156-6, *Multicore and symmetrical pair/quad cables for digital communications – Part 6: Symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz – Work area wiring – Sectional specification*

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

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

⁵ This second edition of IEC 61076-3, is yet to be published.

ITU-T K.20, *Resistibility of telecommunication equipment installed in a telecommunications centre to overvoltages and overcurrents*

ITU-T K.44:2000, *Resistibility tests for telecommunication equipment exposed to overvoltages and overcurrents – Basic recommendation*

EN 50289-1-14, *Communication cables – Specification for test methods – Part 1-14: Electrical test methods – Coupling attenuation or screening attenuation of connecting hardware*

2 Technical information

2.1 Terms and definitions

The terminology used in and applicable to this specification is stated in 2.1 of IEC 61076-1. IEC 60512-1 also contains applicable terms.

2.2 Systems of levels

2.2.1 Interchangeability level

These connectors are intermateable, interoperable and backward compatible with IEC 61076-3-110 and IEC 60603-7 series connectors.

The interchangeability of these connectors, insofar as intermateability, interoperability and backward compatibility requirements are concerned, are ensured for mated connectors when individual connector halves are from different sources.

2.2.2 Intermateability

Intermateability is ensured by applying the “GO” and “NO-GO” gauge requirements as well as adherence to the dimensional requirements.

2.2.3 Interoperability

Interoperability of different IEC 61076-3-110 connectors is ensured by compliance with all transmission requirements when the connector is mated with the respective test-connector as described in Annex C.

These connectors are interoperable with IEC 60603-7-7 and IEC 60603-7-71 series connectors.

NOTE In this detail specification, the term “category”, when used in reference to transmission performance, refers to those categories defined by ISO/IEC 11801.

2.2.4 Backward compatibility

The backward compatibility requirement ensures that a free connector or fixed connector, which is in compliance with this detail specification, mated with a fixed connector or free connector in compliance with IEC 60603-7-7 or IEC 60603-7-71 connectors, shall fully comply with the respective requirements of IEC 60603-7-7 or IEC 60603-7-71 connectors.

2.3 Complete connectors (pairs)

Complete connectors engage a total of up to 12 contacts.

These connectors are interoperable with IEC 60603-7 series connectors.

The IEC 61076-3-110 connector includes up to 12 contacts including up to 8 contacts (1,2,3,4,5,6,7,8) that are similar to a standard IEC 60603-7 series connector. In addition, the IEC 61076-3-110 connector includes up to 4 additional contacts (6',3',4',5') located on the opposite side from the original contacts' positions of a basic IEC 60603-7 series connectors.

2.4 Fixed connectors

IEC 61076-3-110 fixed connectors may include a rear cavity and side channels.

These features accommodate the switch actuator protrusions on IEC 60603-7-7 and IEC 60603-7-71 free connectors.

2.5 Free connectors

IEC 61076-3-110 free connectors may include front and side protrusions.

The free connector front switch actuator protrusion may be provided for operating the IEC 60603-7-7 or IEC 60603-7-71 fixed connector switch actuator, if present.

The free connector side protrusions may be provided for precluding mating with lower frequency IEC 60603-7-X series fixed connectors.

2.6 Classification into climate categories

Classification into climatic categories is specified in 4.2.

2.7 Clearance and creepage distances

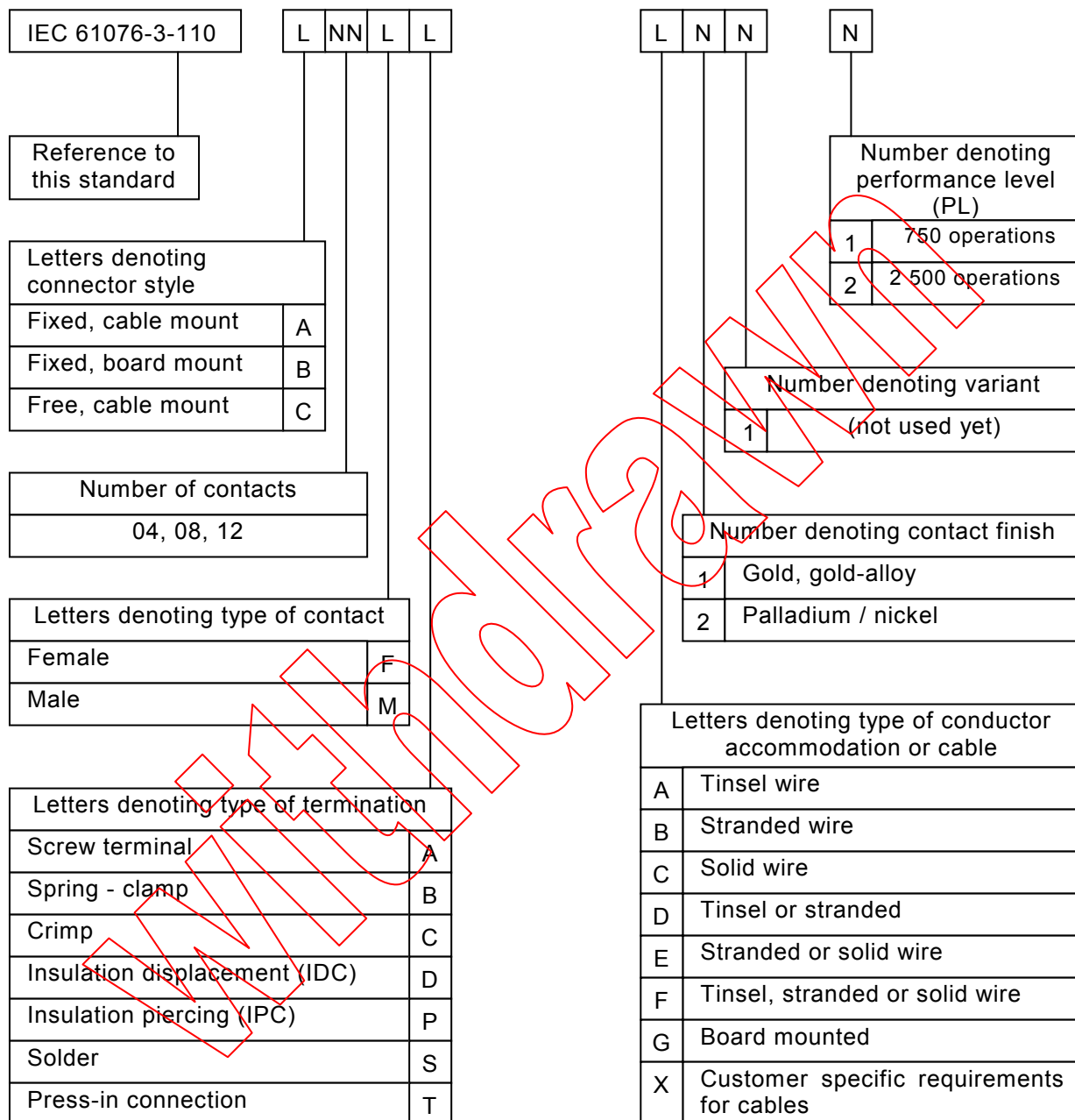
Clearance and creepage distances are specified in 4.4.1.

2.8 Current carrying capacity

Current carrying capacity is specified in 4.4.3.

2.9 IEC type designation

Connectors, connector bodies and connectors with pre-inserted contacts according to this specification shall be designated by the following system:



Key

L letter

N number

EXAMPLE IEC 61076-3-110 A08FD-E11-1: Fixed connector, cable mount, having 8 female contacts with IDC termination for stranded or solid wire, gold plated, meeting performance level 1.

2.10 Marking

The marking of the connector and the package shall be in accordance with 2.7 of the future second edition of IEC 61076-3.

3 Dimensional information

3.1 General

The shape of the connectors may deviate from those given in the following drawings as long as the specified dimensions are not influenced.

Dimensions are given in millimetres.

Drawings are shown in first angle projection unless specifically stated otherwise in the figure.

3.2 Isometric view and common features

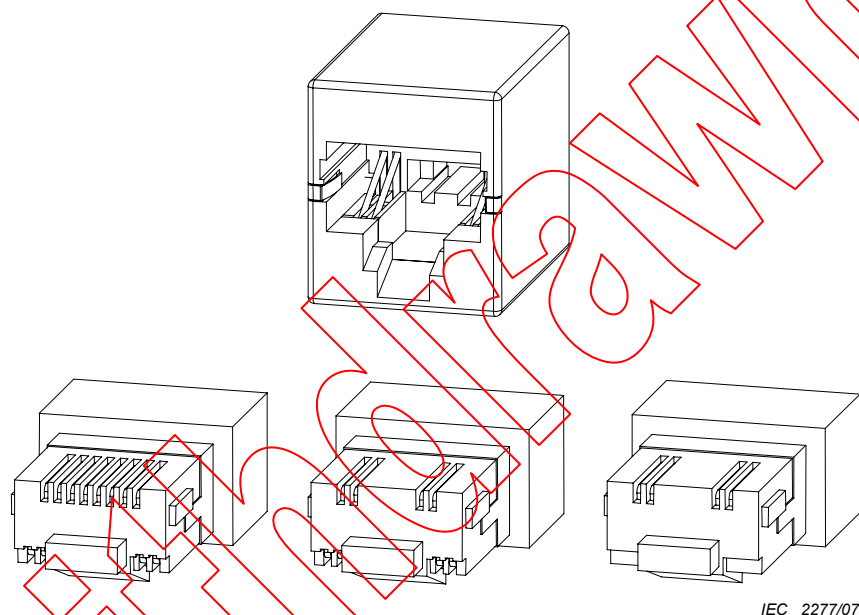


Figure 1 – Isometric view, fixed 8 and 12 pole and free 8, 12 and 4 pole connectors

These connectors have common features, i.e. contacts arrangement, mating information and coupling device.

These connectors have the same common features as IEC 60603-7 series connectors.

Mating alignment is controlled by a vertical and horizontal reference plane and by the centring of the coupling device (latch)

3.3 Mating information

Common dimensions are given in Figure 2 and in Table 1.

Care shall be taken that contacts avoid interference with the plastic of the free connector.

The mating information shown can only be achieved with a free connector with a cable attached.

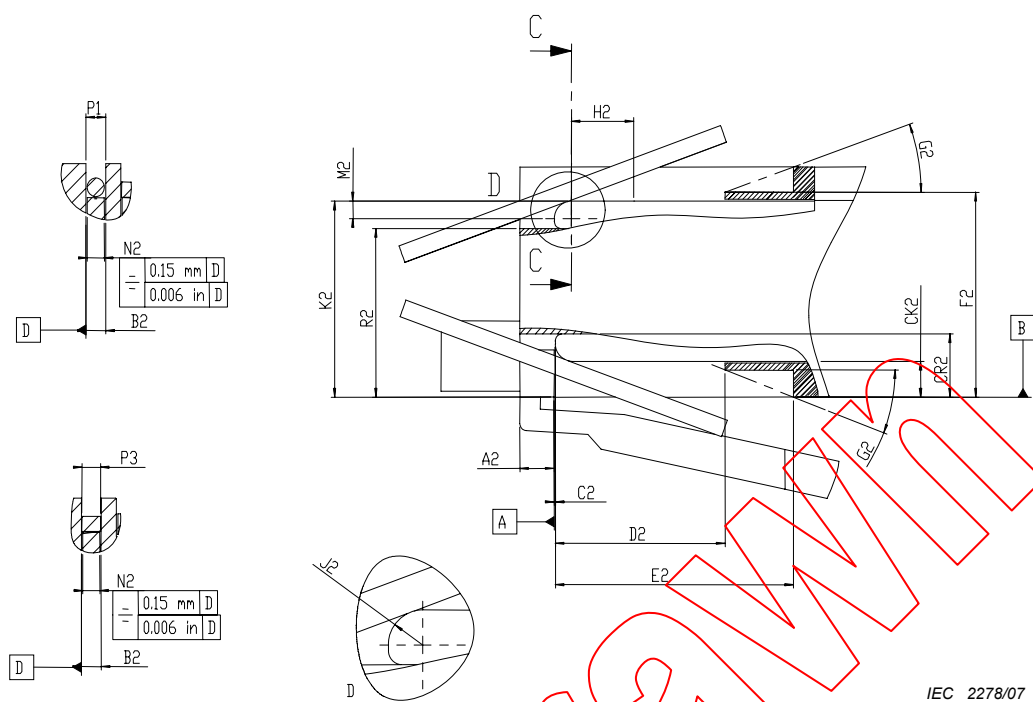


Figure 2 – Physical interface, contacts interface dimensions

Table 1 – Physical interface, contacts interface – Dimensions

Letter	Maximum	Minimum
	mm	mm
A2	1,45	0,89
B2	0,61	0,51
C2	0,46	0,03
D2		2,79
E2		4,11
F2	6,22	
H2 ^a		0,38
J2	0,64	0,38
K2	6,15	5,89
M2 ^b		0,30
N2		0,28
P1 ^c	0,50	0,45
P3 ^d	0,50	0,36
R2	4,83	
CK2	0,60	0,50
CR2		1,70
G2 (angle)	10°	
^a H2: Burrs shall not project above top of contact in this area. ^b M2: Minimum preferred contact configuration. ^c P1: preferred fixed connector contact configuration. ^d P3: optional fixed connector contact configuration. View D: preferred contact interface detail.		

3.4 Fixed connectors

3.4.1 Common dimensions for fixed connectors

Common dimensions are given in Figure 3 and Figure 4 and in Table 2.

All internal corners in the connector cavity shall have a 0,38 mm radius maximum unless otherwise specified.

Contacts are shown at rest. Contacts shall always be contained inside guide slots. Contacts shall move freely within their guide slots.

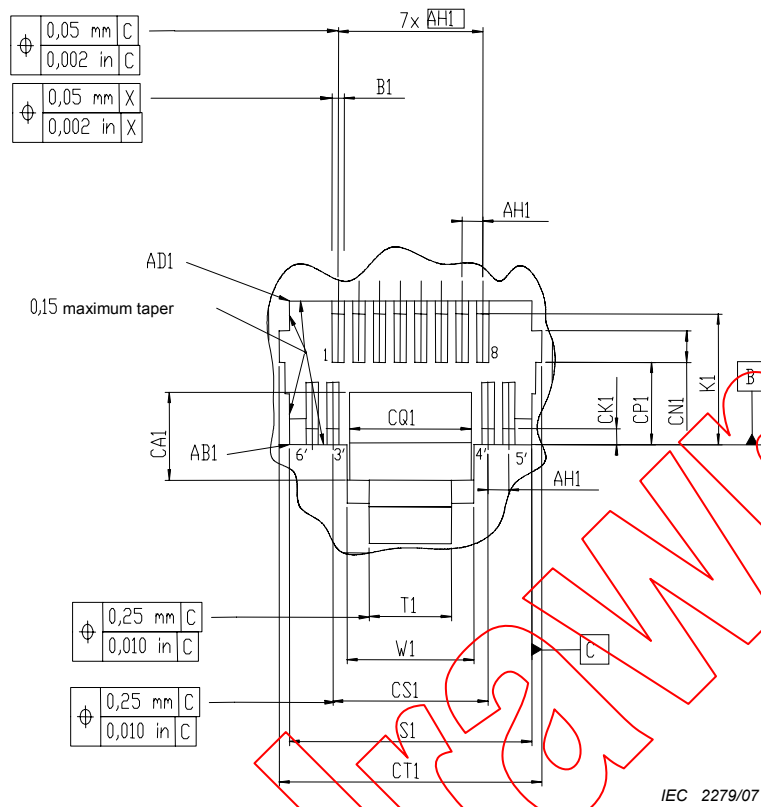


Figure 3 – Physical interface, fixed connector, front view – Dimensions

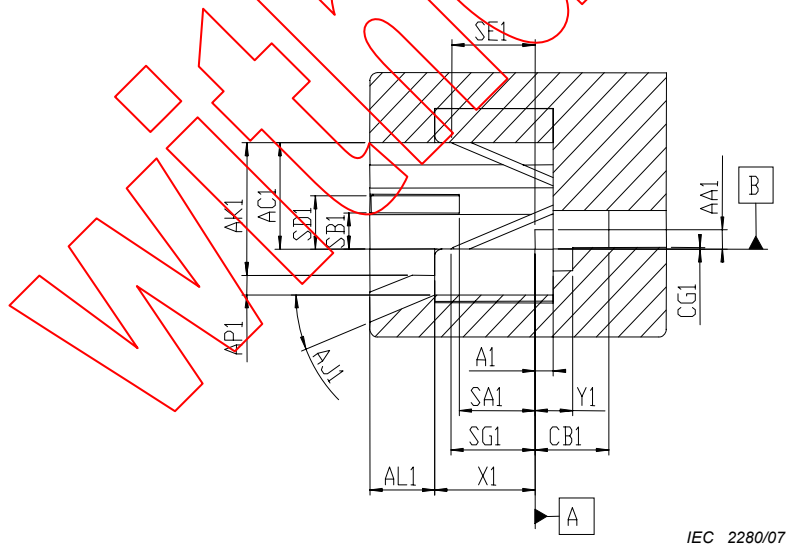


Figure 4 – Physical interface, fixed connector, side view – Dimensions

Table 2 – Fixed connector common dimensions

Letter	Maximum	Minimum	Nominal
	mm	mm	mm
A1		1,47	
B1	0,71		
K1 ^a	5,84		
S1	12,04	11,84	11,94
T1	4,19	3,94	
W1	6,38	6,22	
X1	6,86	6,68	
Y1		2,34	
AA1 ^b	1,24		
AB1	0,38		
AC1	6,96	6,76	6,86
AD1	0,13		
AH1 ^c			1,02
AK1	8,66	8,38	
AL1 ^d		1,40	
AP1 ^e		1,27	
CA1	2,30	2,20	
CB1		2,95	
CG1	0,10		
CK1 ^a		0,65	
CN1	1,40	1,30	
CP1	5,05	4,95	
CQ1	6,00	5,80	
CS1			7,66
CT1	13,0	12,9	
SA1		5,31	
SB1		2,16	
SD1	4,90		
SE1 ^f	5,80		
SG1 ^{g, h}	5,80		
AJ1 (angle)			15°

a K1, CK1: Contact zone. Contacts shall be completely within their individual contact zone in the area indicated.
b AA1: Preferred male free connector stop.
c AH1: True position.
d AL1: Front surface need not be planar or coincident with the surface below the locking device, as long as insertion, latching and unlatching of free connectors is not inhibited. Projections beyond AL1 dimension shall not prevent finger access to the free connector locking (coupling) device.
e AP1: Flat surface.
f SE1: Maximum forward extension of contacts below surface AC1 to avoid contact with shields of free connectors. Applies in the mated state.
g SG1: To maintain the clearance requirement between signal conductors 6',3',4',5' of the fixed connector and the screen of the free connector when the fixed connector is mated with a IEC 60603-7-1,2,3,4,5 free connector. Note that SG1 is typically 0,0 mm in the mated state with a IEC 60603-7-1,2,3,4,5 free connector.
h SG1: Maximum forward extension of contacts above surface reference plane B, to avoid contact with shields of free connectors. Applies in the mated state.

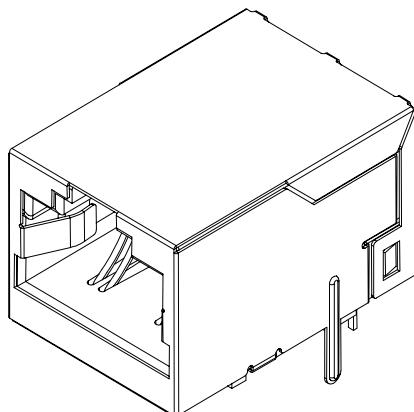
Care shall be taken that all screen contacts of the fixed connector always make contact with the screen contacts of the free connector in worst case condition to ensure reliable performance.

3.4.2 Fixed connector styles

3.4.2.1 Style A, fixed connector, cable mounted

Outside dimensions for cable mounted fixed connectors are not specified.

3.4.2.2 Style B, fixed connector, board mounted



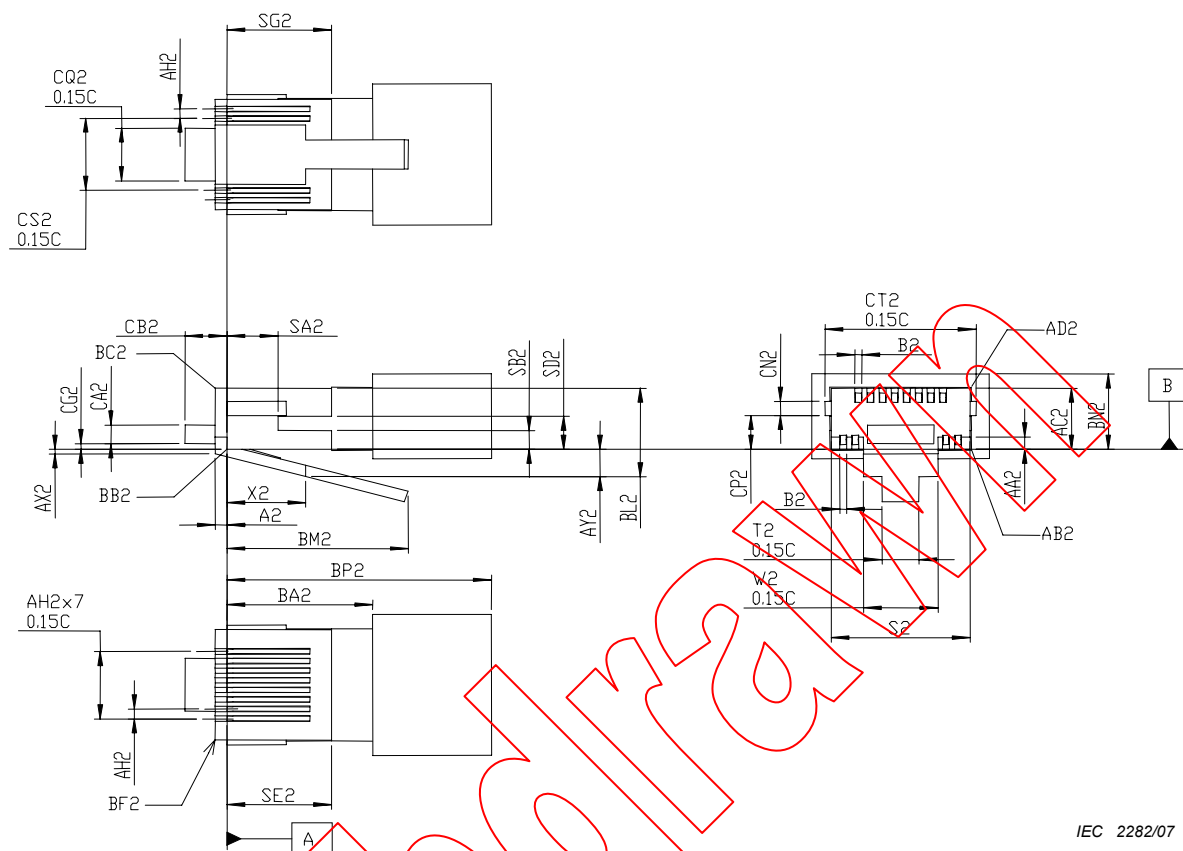
IEC 2281/07

Figure 5 – Fixed connector, board mounted – Example

3.5 Free connectors

Common dimensions are given in Figure 6 and in Table 3.

Full radius permitted on all contact slots.



IEC 2282/07

Figure 6 – Physical interface, free connector – Dimensions

Table 3 – Common dimensions – Free connector

Letter	Maximum	Minimum	Nominal
	mm	mm	mm
A2	1,45	0,89	1,17
B2	0,61	0,51	0,56
S2	11,79	11,58	11,68
T2	3,38	3,12	
W2	6,17	6,02	
X2	6,51	6,36	
AA2		1,24	
AB2	0,64	0,38	
AC2	6,71	6,50	6,60
AD2	0,64	0,13	
AH2 ^a			1,02
AX2	1,32		
AY2	2,87	2,67	
BA2		12,32	
BB2	1,14	0,88	
BC2	1,02	0,51	
BF2	0,64		
BL2 ^b	8,36		
BM2	15,88	14,61	
BN2	9,24		
BP2	23,11		
CA2	2,20	2,00	
CB2	3,95	3,75	
CG2	0,22	0,12	
CN2	1,30	1,20	
CP2	5,05	4,95	
CQ2	5,70	5,50	
CS2 ^a			7,66
CT2	12,85	12,75	
SA2	4,22		
SB2	2,11		
SD2		4,95	
SE2		6,85	
SG2		6,85	

^a AH2, CS2: These dimensions apply to the locations of the contact slots.
^b BL2: Applies with locking device depressed.

3.6 Terminations

3.6.1 General

A connector may include multiple terminations between the cable termination and the separable contact interface. These may include press-in (compliant pin) connections of fixed connector springs into PCBs, for example. All terminations shall meet the relevant termination requirements.

When a type of solderless termination is used which is not covered by any IEC specification, and the supplier cannot demonstrate a similar level of performance, or there is no applicable IEC 60352 standard to be used as reference, the supplier shall show conformance with the full test schedule in 7.7 for all possible variations of terminations, e.g. each cable construction type (screen construction types, wire construction (solid, flexible)) the connector is intended to be used for.

Free connectors are intended to be terminated to cables to provide connector and cable assemblies. The connector type designation provides basic terminations concerning the type of conductor (tinsel, stranded, solid) to which the conductor may be applied, and the type of connection used (solder, insulation displacement, etc.). Specific details concerning wire gauge size, type and thickness of conductor insulation, size and shape of cordage or cable jacket, etc., are not intended to be part of this specification. Minor variations in a free connector's interior details to accommodate differing wire gauge sizes, outer jackets, etc., do not require the generation of new free connector specifications.

If the connector is able to be used with multiple cable types, the manufacturer shall assure that all terminations comply with the relevant IEC standards with each of the cable types.

3.6.2 Referenced solderless termination types

If a type of solderless termination is used, which is covered by a IEC 60352 series specification, the supplier shall assure its reliability by performing tests and demonstrating a level of performance, according to IEC 60352 specifications.

3.6.2.1 Insulation displacement terminations

These terminations shall conform to IEC 60352-3 or IEC 60352-4.

3.6.2.2 Crimp terminations

These terminations shall conform to IEC 60352-2.

3.6.2.3 Insulation piercing terminations

These terminations shall conform to IEC 60352-6.

3.6.2.4 Press-in (compliant pin) terminations

These pins shall conform to IEC 60352-5.

3.6.2.5 Spring clamp terminations

These terminations shall conform to IEC 60352-7.

3.6.3 Non-referenced solderless termination types

If a type of solderless termination is used, which is not covered by any IEC 60352 series specification, the supplier shall assure its reliability by performing similar tests, and demonstrating a similar level of performance, to those covered by IEC 60352 series.

3.6.4 Solder terminations

Solder terminations are not covered in IEC 60352 series and are allowed.

3.7 Mounting information

3.7.1 Mounting information for fixed connectors

Fixed connector mounting information is not specified and shall be determined by the manufacturer.

3.7.1.1 Hole pattern on printed boards

Fixed connector printed boards hole pattern on is not specified and shall be determined by the manufacturer.

3.7.1.2 Mounting on panels

Fixed connector mounting on panels is not specified and shall be determined by the manufacturer.

3.7.2 Mounting information for free connectors

Free connectors mounting information for mounting on to cables is not specified and shall be determined by the manufacturer.

3.8 Gauges

3.8.1 Sizing gauges and retention force gauges; mechanical function, engaging/separating/insertion/withdrawal force

3.8.1.1 Fixed connector gauges

Gauges shall be made according to the following requirements:

Material: tool steel, hardened.

✓ = Surface roughness, according to ISO 1302.

Ra = 0,25 µm maximum

A 0,01 mm wear tolerance shall be applied.

Clearance shall be provided for signal contacts and screen contacts (not shown on drawings).

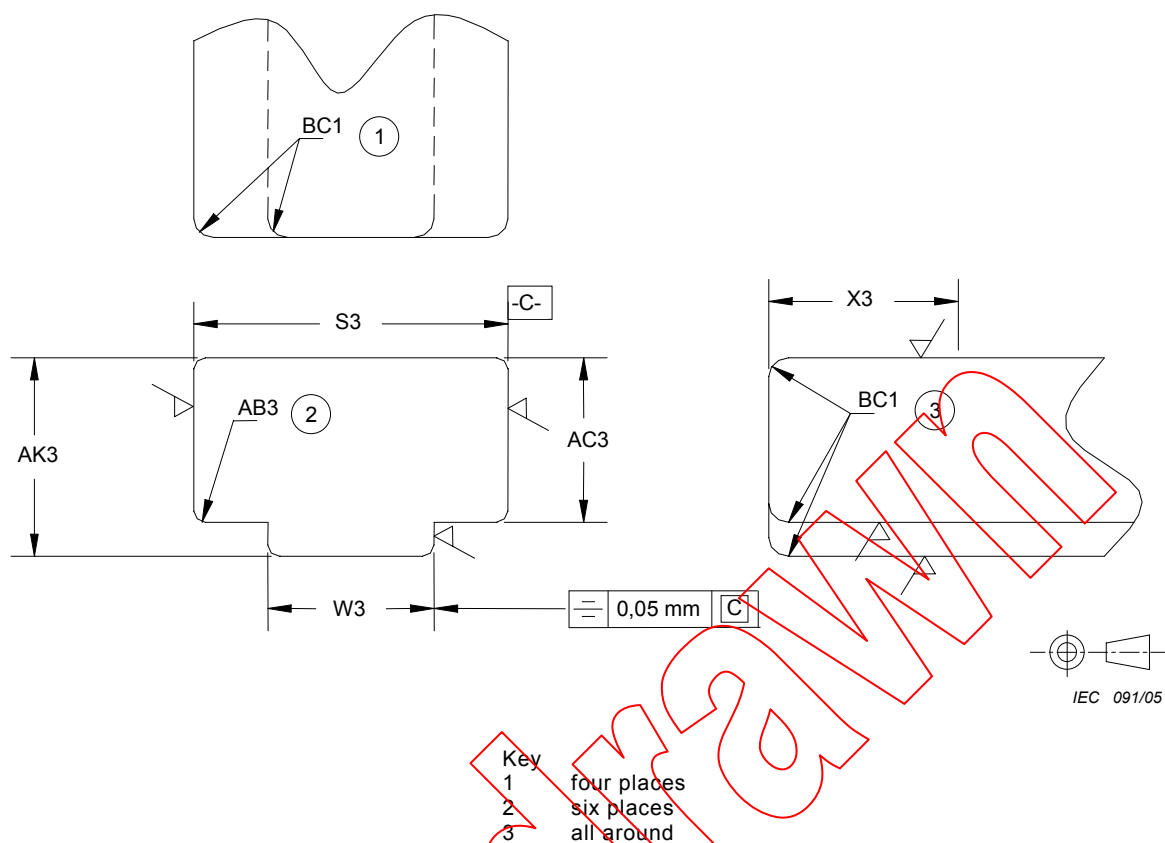


Figure 7 – Fixed connector “Go” gauge

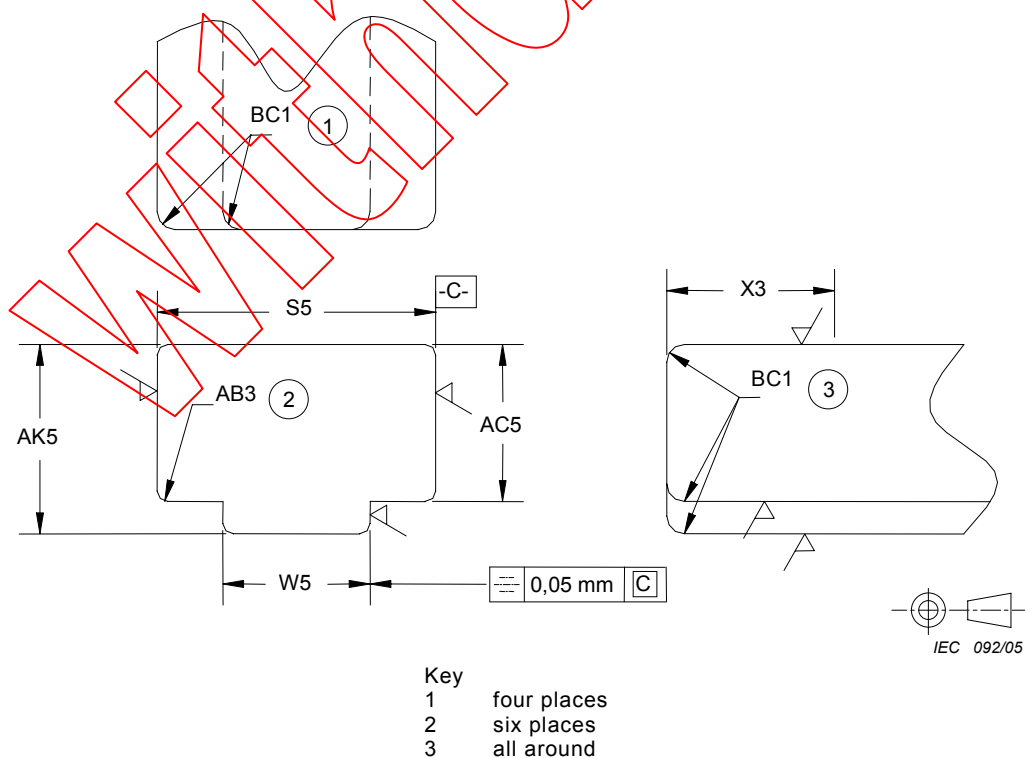


Figure 8 – Fixed connector “No-Go” gauge – Width

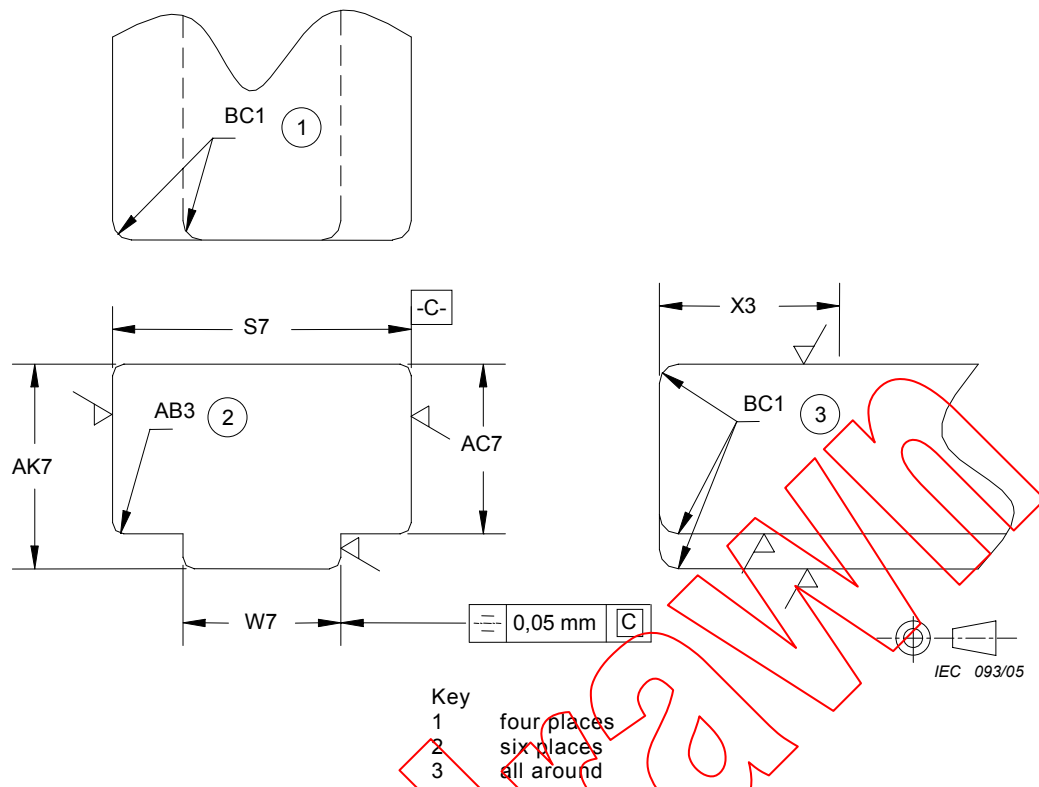


Figure 9 – Fixed connector “No-Go” gauge – Height

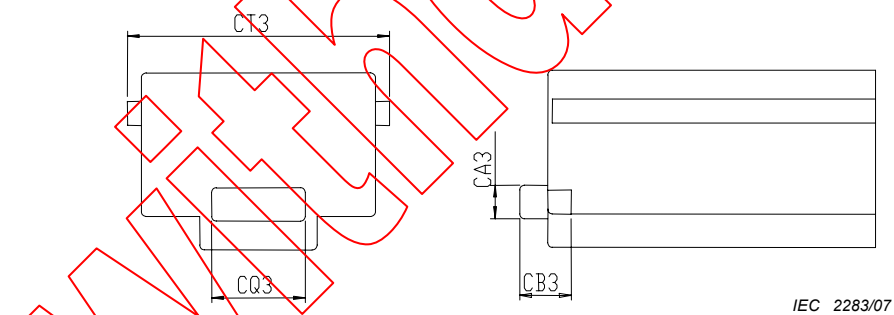
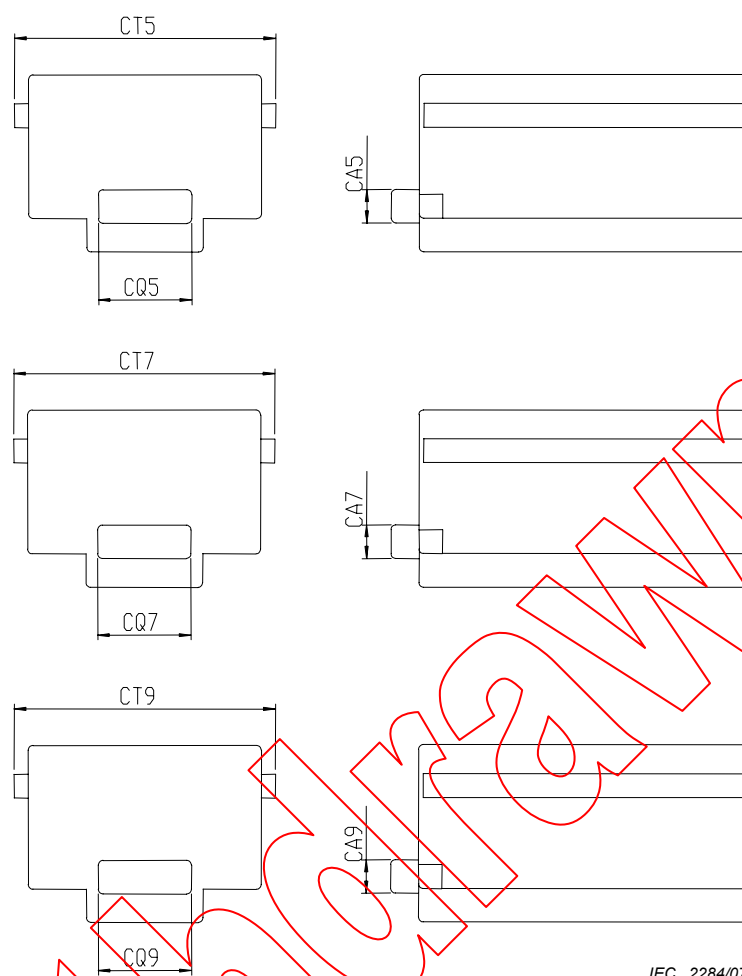


Figure 10 – Fixed connector additional “Go” gauge



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NOTE Width gauge, depth gauge, height gauge

Figure 11 – Fixed connector additional "No-Go" gauges

Table 4 – Fixed connector gauges – Dimensions

Letter	Maximum	Minimum	Nominal (ref)
	mm	mm	mm
S3	11,796	11,786	
S5	12,050	12,040	
S7	11,68	11,58	
X3		10,16	
AB3	0,51	0,389	0,450
AC3	6,716	6,706	
AC5	6,45	6,35	
AC7	6,970	6,96	
BC1	0,89	0,64	0,76
W3	6,12	6,109	
W5	6,38	6,365	
W7	5,97	5,89	
AK3	8,357	8,346	
AK5	8,13	8,05	
AK7	8,672	8,66	
CA3	2,17	2,03	
CA5	2,17	2,03	
CA7	2,31	2,3	
CA9	2,17	2,03	
CB3	2,27	2,08	
CQ3	5,7	5,55	
CQ5	5,7	5,55	
CQ7	5,7	5,55	
CQ9	6,01	6,0	
CT3	12,87	12,81	
CT5	13,01	13,0	
CT7	12,87	12,81	
CT9	12,87	12,81	

3.8.1.2 Free connector gauges

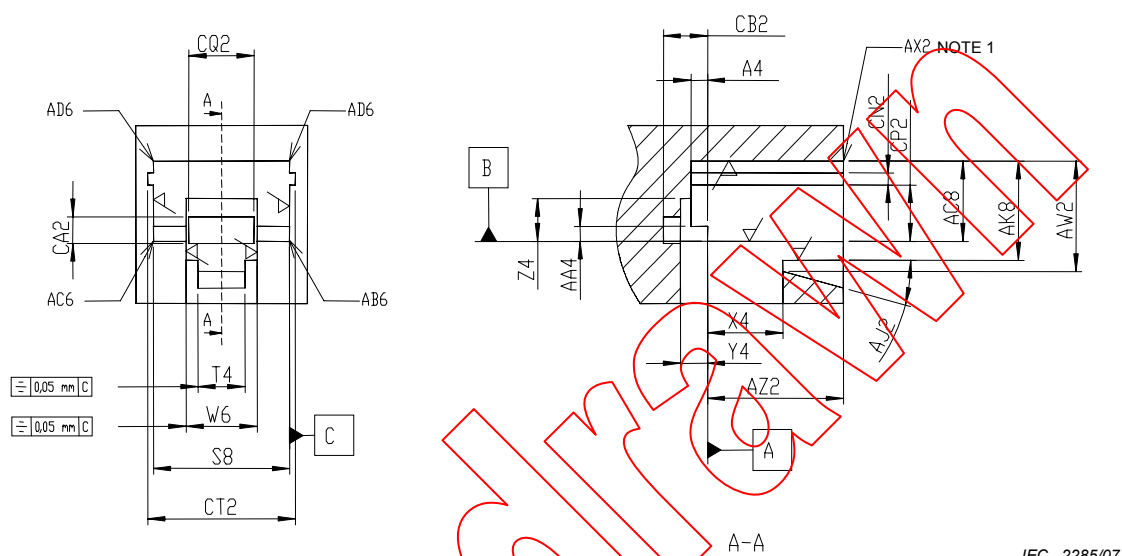
Gauges shall be made according to the following requirements:

Material: tool steel, hardened.

✓ = Surface roughness, according to ISO 1302

Ra = 0,25 µm maximum.

A 0,01 mm wear tolerance shall be applied.



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Figure 12 – Free connector “Go” gauge

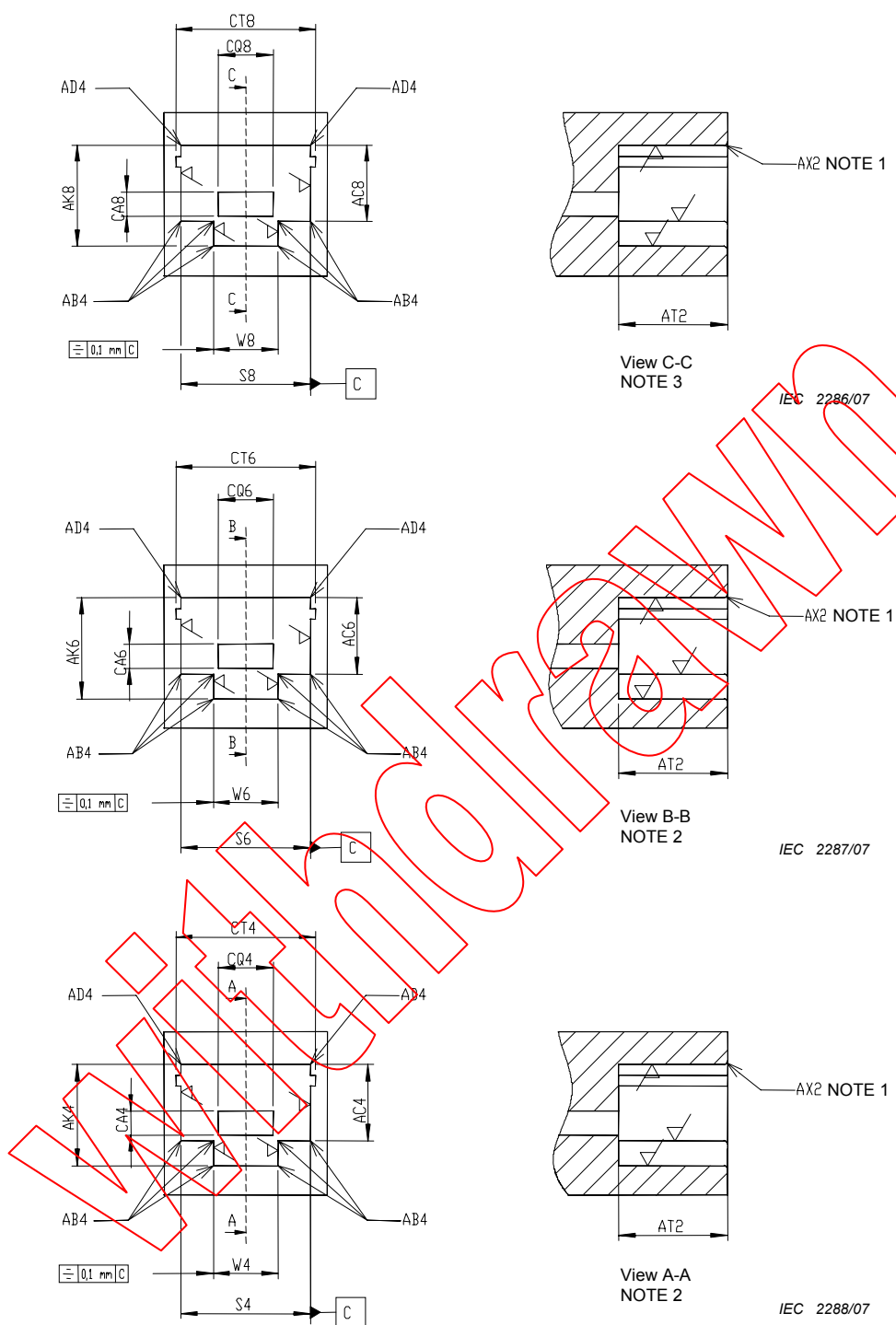


Figure 13 – Free connector “No-go” gauges

Table 5 – Free connector gauges – Dimensions

Letter	Maximum	Minimum
	mm	mm
A4	1,448	1,438
S4	11,593	11,582
S6	11,989	11,887
S8	11,847	11,836
T4	4,115	4,013
W4	6,02	6,010
W6	6,40	6,30
W8	6,198	6,187
X4	6,604	6,594
Y4	2,39	2,34
Z4	2,39	2,29
AA4	1,255	1,245
AB4	0,38	0,0
AB6	0,38	0,0
AC4	6,91	6,81
AC6	6,512	6,502
AC8	6,767	6,756
AD4	0,127	0,0
AD6	0,13	0,0
AK4	9,42	9,32
AK8	8,357	8,346
AT2	15,29	15,19
AW2	9,42	9,32
AX2	0,635	0,38
AY2	0,305	0,295
AZ2	11,91	11,81
CA2	2,22	2,21
CA4	2,22	2,21
CA6	2,22	2,21
CA8	2,0	1,99
CQ2	5,81	5,71
CQ4	5,81	5,71
CQ6	5,7	5,69
CQ8	5,81	5,71
CT2	12,96	12,86
CT4	12,85	12,84
CT6	12,96	12,86
CT8	12,96	12,86
AJ2 (angle)	16°	14°

3.8.2 Mechanical function, engaging/separating/insertion/withdrawal force gauges

Mechanical function is determined using the sizing gauges given in 3.8.1 according to requirements given in 4.6.3.

3.8.3 Probes

Probe damage testing is not specified.

3.8.4 Contact resistance gauge

Contact resistance is only specified for mated connectors.

3.8.5 Test panel (for voltage proof test)

These connectors are screened. The connector shield forms the ground conductor for voltage proof testing.

3.8.6 Test panel (for EMC/crosstalk, etc.)

No test panel is specified for testing EMC or crosstalk requirements.

4 Characteristics

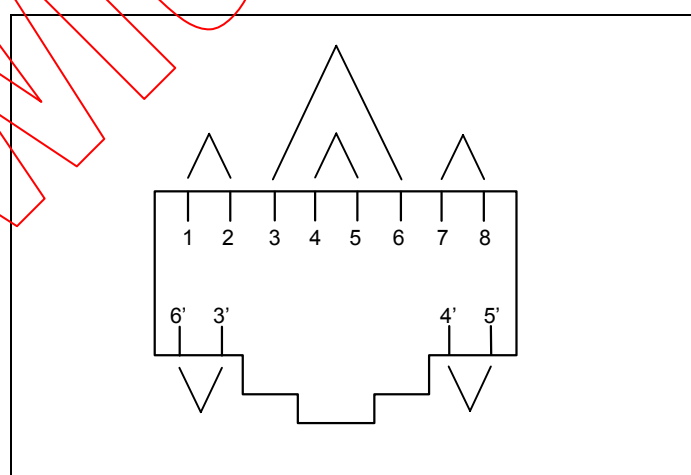
4.1 General

All the requirements and test schedules apply to the entire mated connectors unless otherwise specified.

The characteristics given here are similar to those given in IEC 60603-7-7 and IEC 60603-7-71.

4.2 Pin and pair grouping assignment

For those specifications for which pin and pair groupings are relevant, unless otherwise specified, the pin and pair grouping assignments shall be as shown in Figure 14. The 8-contact type typically uses contact numbers 1, 2, 7, 8, 6', 3', 4', 5'. The 4-contact type typically uses contact numbers 1, 2, 7, 8. See other IEC 60603-7 series standards for requirements of contact numbers 3, 6, 4, 5.



IEC 2289/07

**Figure 14 – Fixed connector pin and pair grouping assignment
(front view of connector)**

4.3 Climatic category

The lowest and highest temperatures and the duration of the damp heat, steady-state test should be selected from the preferred values stated in 2.2 of IEC 61076-1. The connectors are classified into climatic categories in accordance with 2.3 of IEC 60068-1. The following preferred temperature range and severity of the damp heat steady-state test have been selected to comply with IEC 61156 (for cables used with these connectors).

Table 6 – Climatic categories – Selected values

Climatic category	Temperature range °C	Damp heat steady state days
40/070/21	–40 to +70	21

4.4 Electrical characteristics

4.4.1 Creepage and clearance distance

The permissible operating voltages depend on the application and on the applicable or specified safety requirements.

Insulation coordination is not required for this connector; therefore, the creepage and clearance distances in IEC 60664-1 are reduced and covered by overall performance requirements.

Therefore, the creepage and clearance distances are given as operating characteristics of mated connectors.

In practice, reductions in creepage or clearance distances may occur due to the conductive pattern of the printed board or the wiring used, and shall duly be taken into account.

Table 7 – Minimum distances

Type	Minimum distance between contacts and chassis		Minimum distance between adjacent contacts	
	Creepage	Clearance	Creepage	Clearance
	mm	mm	mm	mm
A, C	1,40	0,51	0,36	0,36

4.4.2 Voltage proof

Conditions: IEC 60512, Test 4a, Method A.

Mated connectors: standard atmospheric conditions.

1 000 V d.c. or a.c. peak, contact-to-contact.

1 500 V d.c. or a.c. peak, contact-to-test panel or contact-to-shield.

4.4.3 Current-carrying capacity

Conditions: IEC 60512, Test 5b.

All contacts, connected in series.

The current-carrying capacity of connectors in accordance with the requirements of 2.5 of IEC 61076-1 shall comply with the de-rating curve Figure 15, and 30 °C maximum temperature rise when applying 0,75 A at 60 °C.

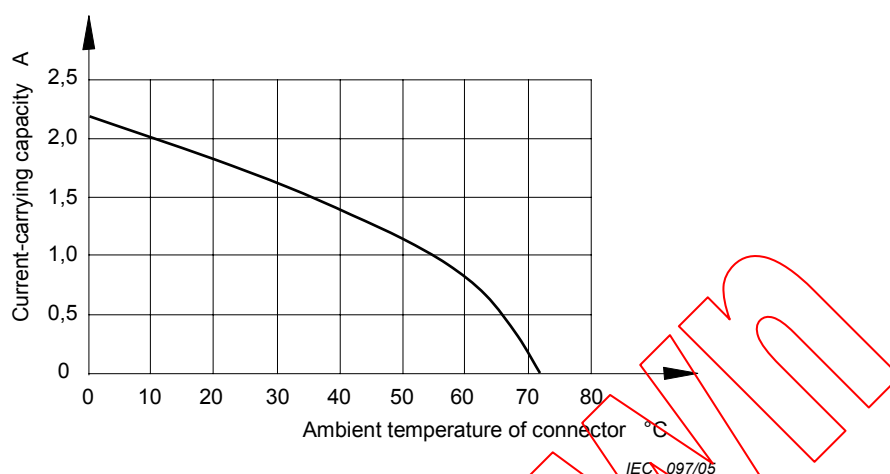


Figure 15 – Connector de-rating curve

4.4.4 Initial contact resistance

Conditions: IEC 60512, Test 2a.

Mated connectors: arranged according to 5.4, connection points: as specified in Figure 14.

Signal contacts: 20 mΩ maximum.

Screen contact: 20 mΩ maximum.

Switch contact: 20 mΩ maximum.

4.4.5 Input to output resistance

Conditions: IEC 60512, Test 2a.

Mated connectors: connection points: cable termination to cable termination.

Signal contacts: 200 mΩ maximum.

Screen: 100 mΩ maximum.

4.4.6 Input to output resistance unbalance

Conditions: IEC 60512, Test 2a.

Mated connectors, connection points: cable termination to cable termination.

Among all signal conductors, maximum difference between maximum and minimum:

50 mΩ maximum

4.4.7 Insulation resistance

Conditions: IEC 60512, Test 3a, Method C.

Mated connectors.

Test voltage: 100 V d.c.

Each contact and screen to all others: 500 MΩ minimum.

4.5 Transmission characteristics

All transmission performance requirements apply for the range of frequency from 1 MHz to 1 000 MHz unless stated otherwise.

These requirements do not apply to pins 3, 6, 4 and 5 of the 12-contact type.

All transmission performance tests, including those conducted according to the future IEC 60512-26-100, apply for the range of frequency from 1 MHz to 1 000 MHz unless stated otherwise.

NOTE 1 Transmission characteristics, is determined according to specific test methods described in test group E.

NOTE 2 Interoperability of independent fixed or free connectors is determined by tests conducted when they are mated with precision test fixtures given in Annex C.

NOTE 3 When given, f is the frequency expressed in MHz.

4.5.1 Insertion loss

Conditions: according to the future IEC 60512-26-100, insertion loss test method.

Mated connectors.

All styles: $\leq 0,02\sqrt{f}$ dB up to 1 000 MHz.

Whenever the formula results in a value less than 0,1 dB, the requirement shall revert to 0,1 dB.

4.5.2 Return loss

Conditions: according to the future IEC 60512-26-100, return loss test method.

Mated connectors.

All styles: $68 - 20 \log(f)$ dB up to 1 000 MHz.

Whenever the formula results in a value greater than 30 dB, the requirement shall revert to 30 dB.

4.5.3 Propagation delay

All styles: $\leq 2,5$ ns.

NOTE The propagation delay test does not need to be performed; it is assumed that connectors comply by design.