

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Connectors for electronic equipment – Printed board connectors –
Part 4-113: Detail specification for two-part connectors having 5 rows with a grid
of 2,54 mm for printed boards and backplanes in bus applications**

**Connecteurs pour équipements électroniques – Connecteurs pour cartes
imprimées –**

**Partie 4-113: Spécification particulière pour connecteurs en deux parties ayant
5 rangées au pas de 2,54 mm pour cartes imprimées enfichables et fonds de
panier, dans des applications en bus**



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IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

CONNECTORS FOR ELECTRONIC EQUIPMENT – PRINTED BOARD CONNECTORS –

Part 4-113: Detail specification for two-part connectors having 5 rows with a grid of 2,54 mm for printed boards and backplanes in bus applications

FOREWORD

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International Standard IEC 61076-4-113 has been prepared by subcommittee 48B: Connectors, of IEC technical committee 48: Electromechanical components and mechanical structures for electronic equipment.

This bilingual version corresponds to the monolingual English version, published in 2002-11.

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

FDIS	Report on voting
48B/1247/FDIS	48B/1283/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.

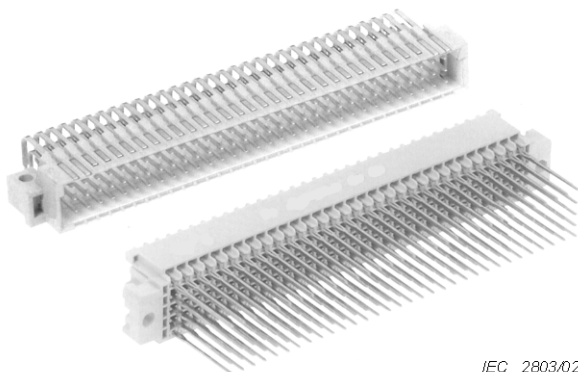
The French version of this standard has not been voted upon.

The committee has decided that the contents of this publication will remain unchanged until 2006. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

CONNECTORS FOR ELECTRONIC EQUIPMENT – PRINTED BOARD CONNECTORS –

Part 4-113: Detail specification for two-part connectors having 5 rows with a grid of 2,54 mm for printed boards and backplanes in bus applications

IEC SC 48B: Connectors Electronic components of assessed quality in accordance with - GENERIC SPECIFICATION IEC 61076-1 Generic specification IEC 61076-1 First edition:1995	IEC 61076-4-113
See 3 for dimensions	Page 6 of 36 pages
 IEC 2803/02	Two-part connectors for printed boards and backplanes, grid of 2,54 mm. Connector with 160 contacts in 5 rows. Rows a, b and c in compliance with IEC 60603-2, 3rd edition. Rows z and d with 32 contacts each usable for standard application or for grounding. Terminations: Free board connector: Solder connections Fixed board connector: Press-in, wire wrap and interface connections

Reference to IEC Guide 109: Environmental aspects

IEC Guide 109 advocates the need to minimize the impact of a product on the natural environment throughout the product life cycle.

It is understood that some of the materials permitted in this standard and manufacturing and assembly procedures may have a negative environmental impact.

As technological advances lead to acceptable alternatives for these materials, they will be eliminated from the standard. Inappropriate manufacturing procedures should be replaced by a design for easy maintainability and disassembly.

1 General data

1.1 Recommended method of mounting

The contacts of free board connectors are provided for solder connections. The terminations of the free board connectors shall fit into holes in the printed board according to IEC 60326-3 and IEC 60326-5, located on a grid of 2,54 mm.

The contacts of fixed board connectors are provided for either press-in connections or press-in connections with an additional wire wrap and mating function.

The connector is fixed by means of the press-in terminations; fixing holes on the backplane are not necessary.

The distance of termination centre lines is 2,54 mm or a multiple of it. The terminations of the fixed board connectors are suited for backplanes having a grid dimension of 2,54 mm.

1.2 Ratings and characteristics

Rated voltage: Contact / contact for fully loaded connector.

Table 1 – Rated voltage

Material group	Pollution degree	Rated voltage V
I, II, IIIa/b	1	400
II, IIIa/b	2	32
NOTE Reference is made to Table 11 of this specification, and to Table 4 of IEC 60664-1 listing the relation between creepage distances, pollution degree and material groups versus voltages r.m.s.		

Current rating:	1 A at 70 °C for fully loaded connector
Insulation resistance:	$\geq 10^{10} \Omega$
Climatic category:	PL1: 55/125/56 PL2: 55/125/21
Printed board thickness:	1,6 mm to 2,4 mm for free board connector 1,6 mm to 6,4 mm for fixed board connector
Contact spacing:	2,54 mm

1.3 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 60068-1:1988, *Environmental testing – Part 1: General and guidance*
Amendment 1 (1992)

IEC 60068-2-54:1985, *Environmental testing – Part 2: Tests. Test Ta: Soldering – Solderability testing by the wetting balance method*

IEC 60097:1991, *Grid systems for printed circuits*

IEC 60326-3:1991, *Printed boards – Part 3: Design and use of printed boards*

IEC 60326-5:1995, *Printed boards – Part 5: Specification for single and double side printed boards with plated-through holes*

IEC 60352-1:1997, *Solderless connections – Part 1: Wrapped connections – General requirements, test methods and practical guidance*

IEC 60352-5:2001, *Solderless connections – Part 5: Press-in connections – General requirements, test methods and practical guidance*

IEC 60512 (all parts)

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

IEC 60603-2:1995, *Connectors for frequencies below 3 MHz for use with printed boards – Part 2: Detail specification for two-part connectors with assessed quality, for printed boards, for basic grid of 2,54 mm (0,1 in) with common mounting features*

IEC 60664-1:2000, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 61076-1:1995, *Connectors with assessed quality, for use in d.c. low frequency analogue and in digital high speed data applications – Part 1: Generic specification*

IEC 61076-4:1995, *Connectors with assessed quality, for use in d.c. low frequency analogue and in digital high speed data applications – Part 4: Sectional specification – Printed board connectors*

IEC Guide 109:1995, *Environmental aspects – Inclusion in electrotechnical product standards*

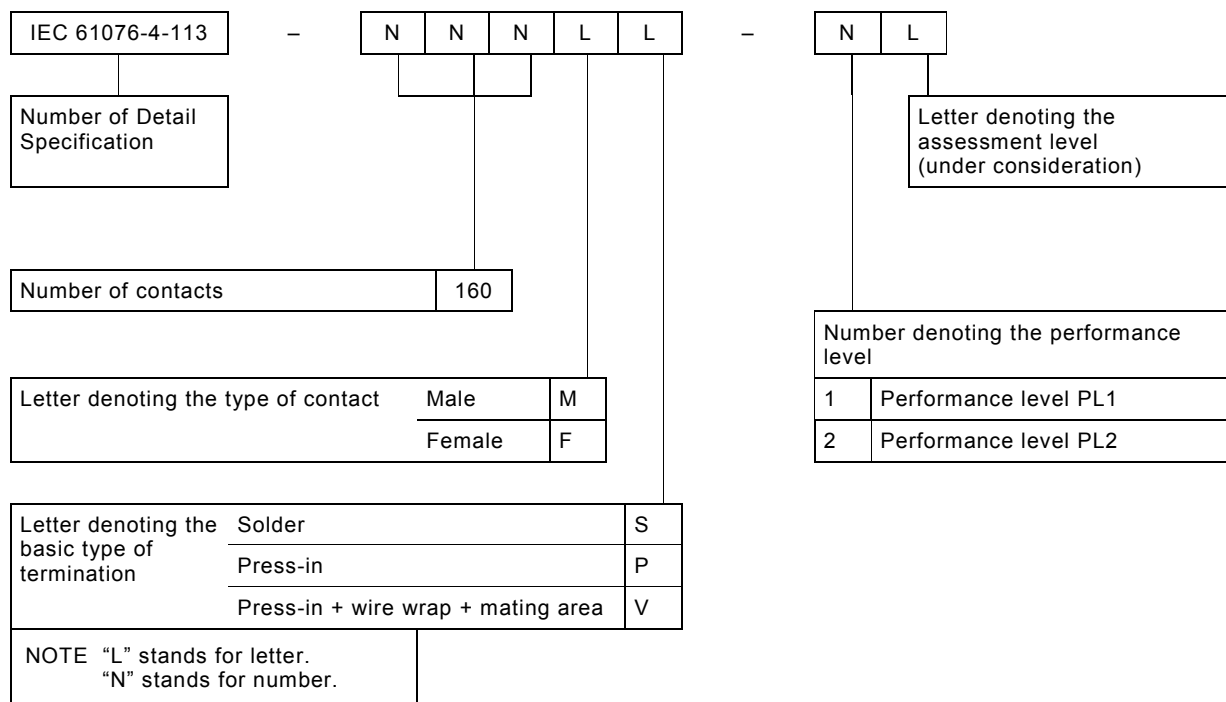
ISO 1302:2002, *Geometrical Product Specifications (GPS) – Indication of surface texture in technical product documentation*

1.4 Marking

The marking of the connector and the package shall be in accordance with 2.6 of IEC 61076-4.

1.5 IEC type designation

Connectors, connector bodies and contacts according to this standard shall be designated by the following system:



EXAMPLE Connector having 160 female contacts with press-in terminations, with performance level 2: IEC 61076-4-113 – 160FP – 2

1.6 Ordering information

To order connectors according to this detail specification, the type designation described in 1.5 shall be used.

2 Technical information

2.1 Definitions

For the purposes of this document the following definitions apply.

2.1.1 Contacts and terminations

press-in and mating function

termination post, usually pressed-in into the backplane and emerging on the rear side as a male contact, to be connected to a free board or cable connector

grounding

rows z and d of free and fixed board connector used as shielding frames, i.e. connected to zero volts

first make last break contact (FMLB)

pre-leading male contacts which facilitate live insertion

2.2 Information on application

2.2.1 Complete connectors (pairs)

2.2.2 Fixed board connectors

Planarity before press-in operation into backplane according to 3.4.1 and after press-in into backplane according to 3.3.4.1.

2.2.3 Free board connectors

Planarity before soldering into printed board according to 3.5.1 and after soldering into printed board according to 3.3.4.1.

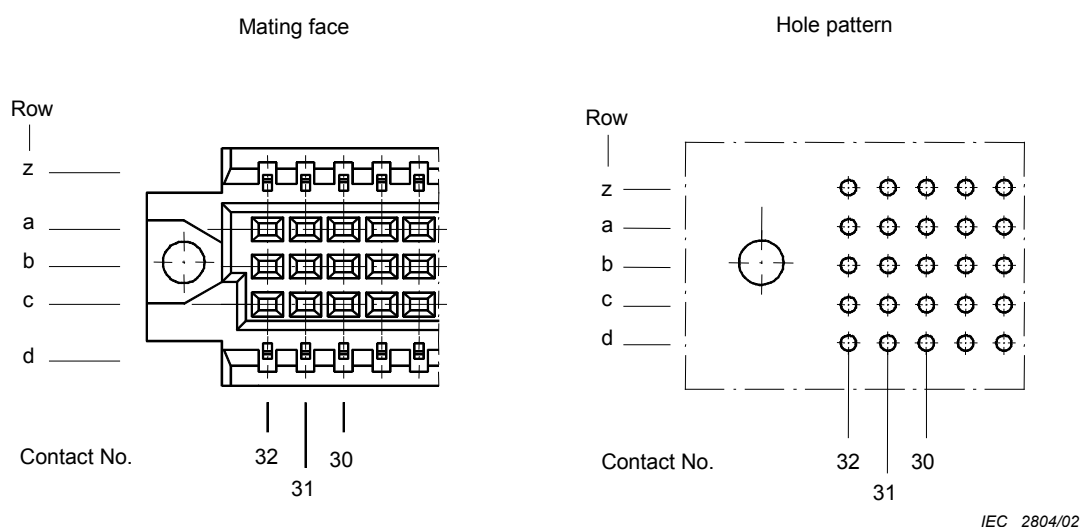
2.2.4 Shielding/grounding

2.2.5 Basic type of termination

Identification letter	Basic type of termination	Length mm
S	90° angled solder-pin for termination to a printed board with a thickness of 1,6 mm to 2,4 mm, hole diameter: 1 mm according to IEC 60326-3	2,9 ± 0,3
P	Straight, solderless, compliant press-in connections for termination to a printed board with a thickness of 1,6 mm to 6,4 mm, hole diameter: 1 mm according to IEC 60326-5	5
V	Straight, solderless, compliant press-in connections and additional wire wrap and mating area to be connected to a free board connector for termination to a printed board with a thickness of 1,6 mm to 6,4 mm, hole diameter: 1 mm according to IEC 60326-5	17

2.3 Contact arrangements

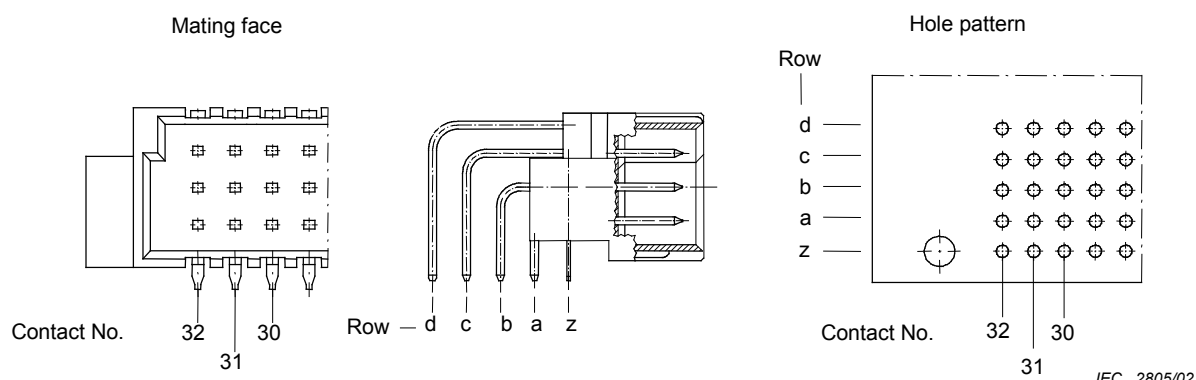
2.3.1 Fixed board connectors



NOTE For mounting information see 3.6.1 (hole pattern).

Figure 1 – Contact arrangements

2.3.2 Free board connectors



NOTE For mounting information see 3.7.1 (hole pattern).

Figure 2 – Contact arrangements

3 Dimensional information

3.1 General

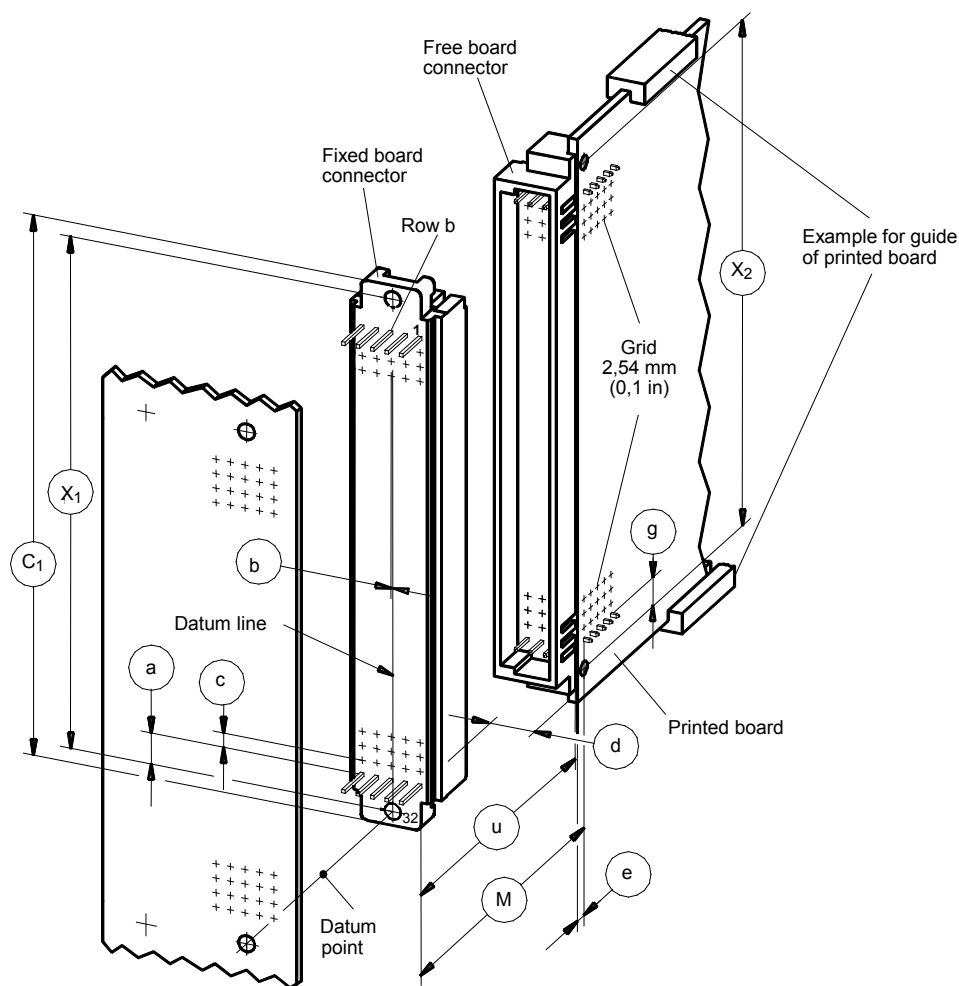
All dimensions are in millimetres.

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

The information about the bending in 3.4 and 3.5 is valid for the condition of delivery.

Dimensions not shown may be chosen according to common characteristics and intended use.

3.2 Isometric view and common features



IEC 2806/02

Figure 3 – Isometric view

Table 2 – Isometric view and common features

Reference letter	Dimensions mm	Legend
C ₁	95	Maximum length of the fixed board connector
M	17,2 15,6	Range of electrical engagement, see 3.2.1
X ₁	90	Distance between the two mounting holes of the fixed board connector
X ₂	88,9	Distance between the two mounting holes of the free board connector ^a
a	5,63	Distance between the datum point and a line through the centres of the termination No. 32 of the fixed board connector
b	0,3	Distance between datum line and a line through the centres of the termination row "b" of the fixed board connector
c	<i>nx2,54</i>	Pitch of the termination of the fixed board connector
d	3,55	Distance between the datum line and the connector side of the printed board
e	2,76	Distance between the edge of the printed board and the first row of termination and the mounting holes for the free board connector
g	5,08	Distance between a mounting hole and the hole for the termination No. 1 or No. 32 of the free board connector
u	14,2 12,4	Range in which reliable contact is ensured, see 3.2.1 for mating information

^a The mounting holes are also located on the grid of 2,54 mm according to IEC 60097.

3.2.1 Depth dimensions

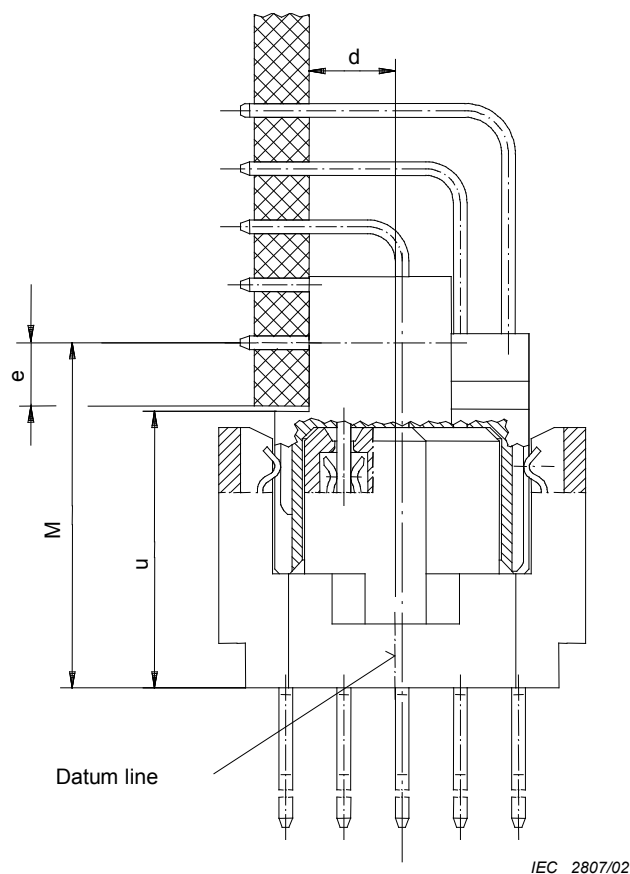


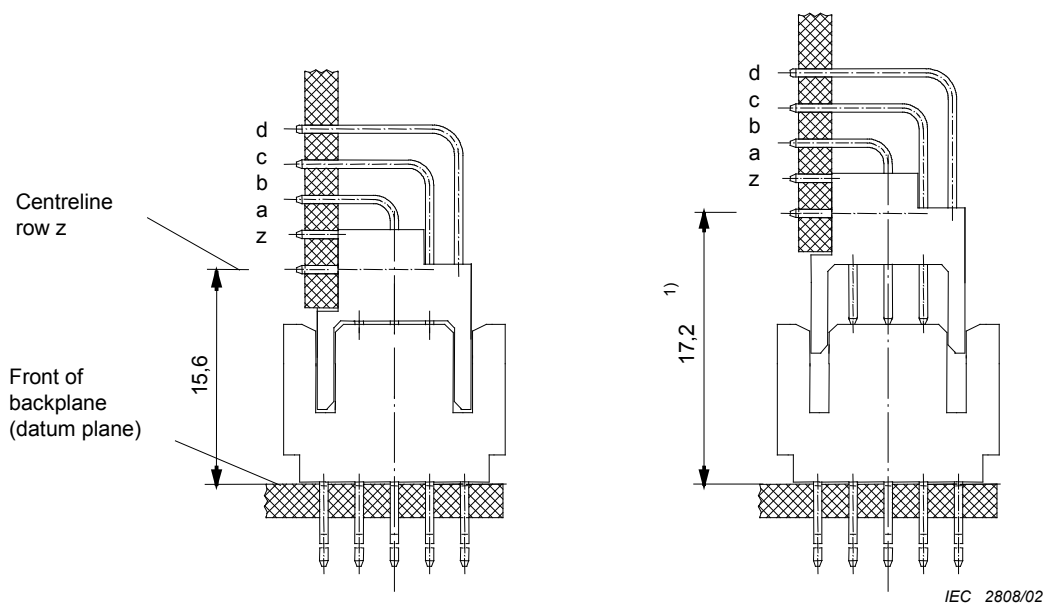
Figure 4 – Depth dimensions

Table 3 – Depth dimensions

Reference letter	Dimension	Legend
M	15,6 – 17,2 (18,7)	Range of electrical engagement ^a
d	3,55	Distance between datum line and connector side of the printed board
e	2,76	Distance between the edge of the printed board and the first termination row and the mounting holes for the free board connector
u	12,4 – 14,2 (15,7)	Range in which reliable contact is ensured ^a
^a Value in brackets for preleading pins in row d, position 1, 2, 31, 32.		

3.3 Engagement (mating) information

3.3.1 Electrical engagement length



1) 18,7 for preleading contacts

Figure 5 – Electrical engagement length

3.3.1.1 First contact point

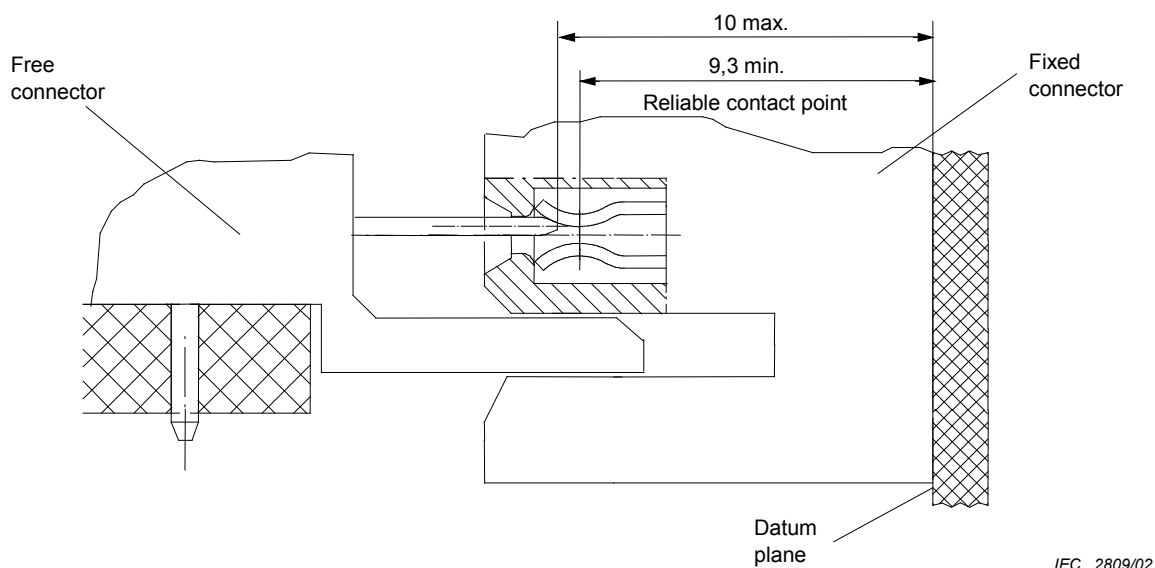


Figure 6 – First contact point

3.3.2 Perpendicular to engagement (mating) direction

The design of the free and fixed board connector shall accept a misalignment of at least 1 mm in the transversal and longitudinal direction of the connectors. To achieve necessary alignment of both parts, one part of the connector pair is float mounted.

For fixed mounted connector pairs, the mounting tolerances shall accordingly be kept in a sufficiently small range.

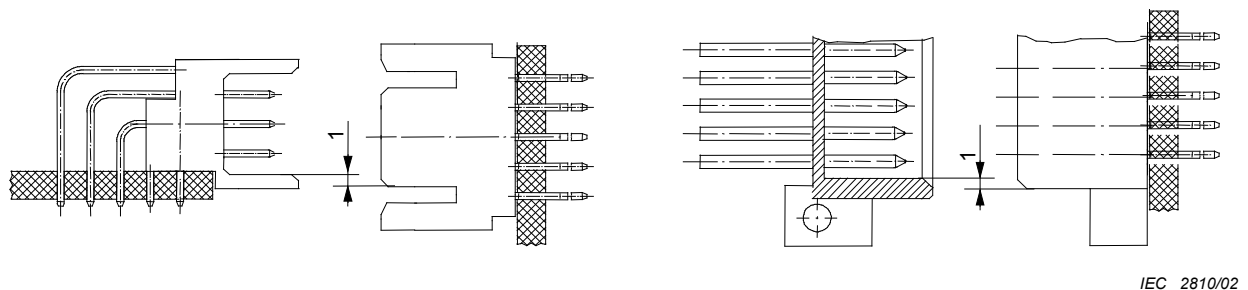


Figure 7 – Perpendicular to engagement (mating) direction

3.3.3 Inclination

The design of the free and fixed board connector shall accept an initial angular misalignment of $\pm 4^\circ$ in longitudinal and $\pm 2^\circ$ transverse axis.

In the mated position the condition according to 3.3.1 shall be met.

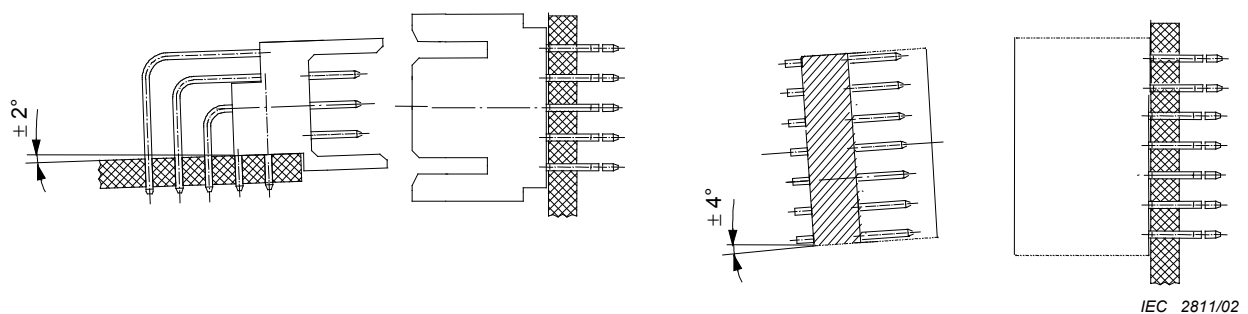
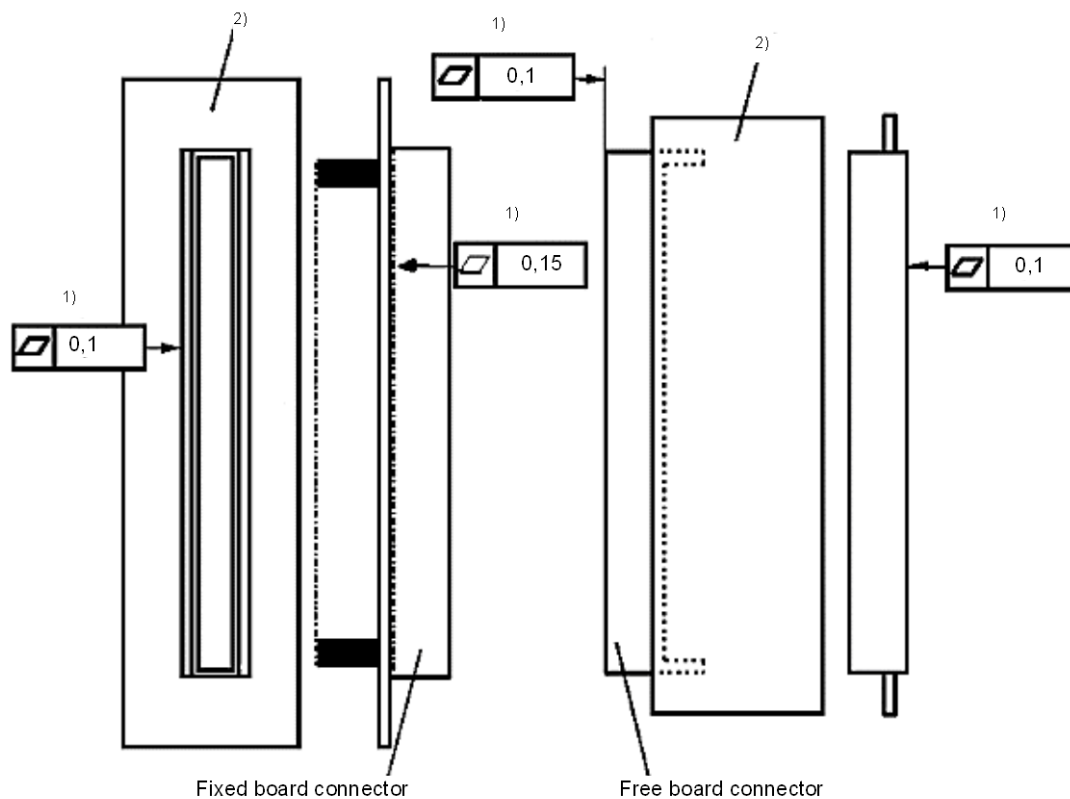


Figure 8 – Inclination

3.3.4 Planarity

The permissible bending and warpage of mounted connectors is shown in 3.3.4.1 In order to guarantee the function of the FMLB contact, the added concave and convex warpage of the mounted male and female connector shall not exceed 0,25 mm.

3.3.4.1 Planarity of mounted connectors



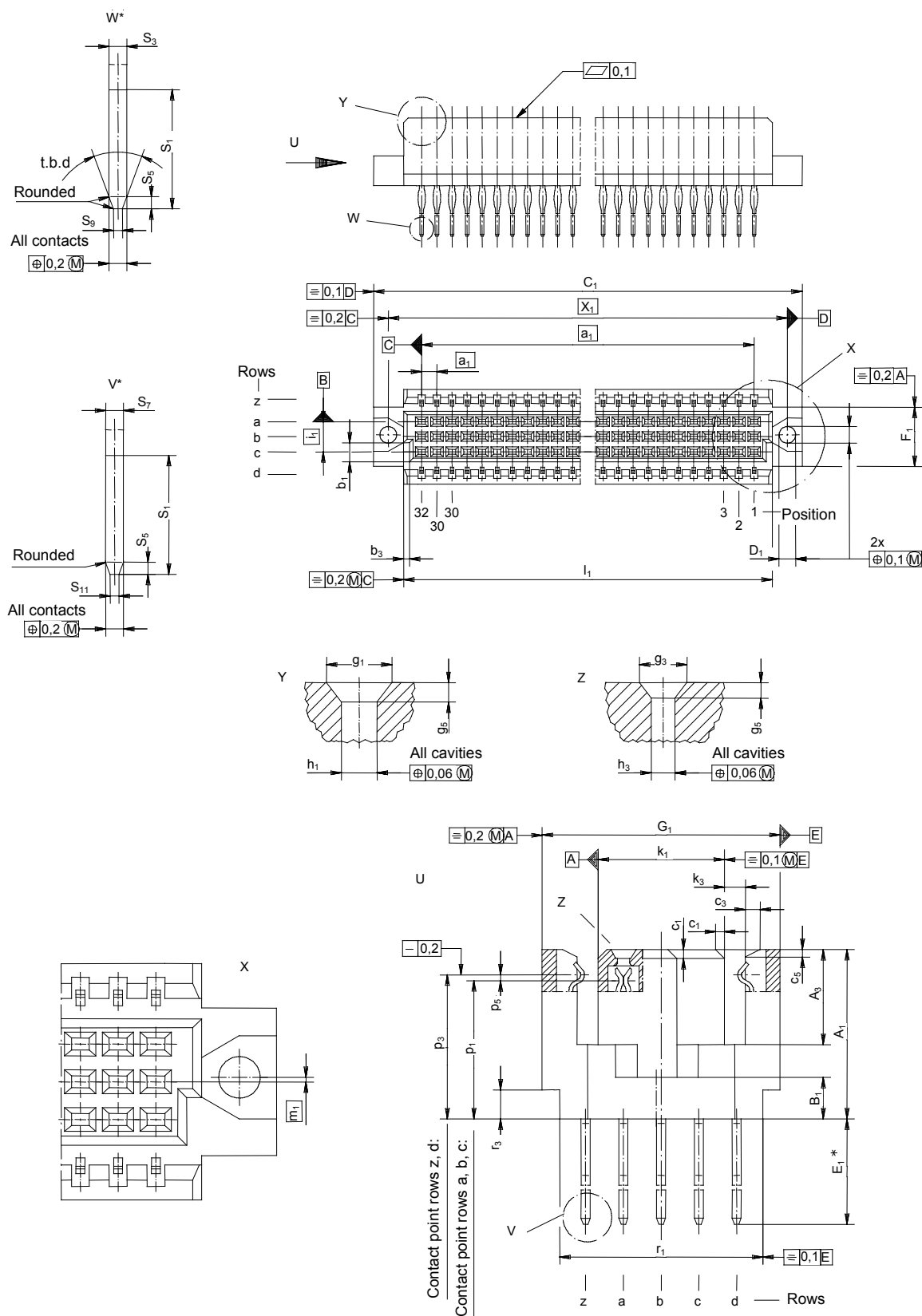
IEC 2812/02

- 1) Valid for total height (concave and convex direction)
- 2) Bending of printed boards according to 5.1.6

Figure 9 – Planarity of mounted connectors

3.4 Fixed board connectors

3.4.1 Dimensions



IEC 2813/02

Figure 10 – Fixed board connector dimensions

Table 4 – Fixed board connector dimensions

Reference letter	Dimension	Reference letter	Dimension	Reference letter	Dimension
A1	11,6 max.	c1	0,7 0,6	p1 ^a	9,3 min.
A3	6,5 min.	c3	1 min.	p3 ^b	9,7 min.
B1	2,85 2,75	c5	0,65 min.	p5	0,2 min.
C1	95 max.	g1	2,2 2,1	r1	13,7 max.
D1	2,8 min.	g3	1,7 1,6	r3	1,9 min.
E1	5 16,8/17,2	g5	0,5 min.	s1	5,9 6,1
F1	10,6 10,4	h1	1,25 1,20	s3	0,70 0,55
G1	16 max.	h3	0,85 0,80	s5	0,65 0,55
X1	90	i1	2×2,54(=5,08)	s7	0,61 0,56
a1	31×2,54(=78,74)	k1	8,5 8,4	s9	0,2 max.
a3	2,54	k3	1,5 1,4	s11	0,15 max.
b1	3,2 3,0	l1	85,0 84,8		
b3	1,1 1,0	m1	0,3		

^a Contact point rows a, b, c.
^b Contact point rows z, d.

3.4.2 Terminations

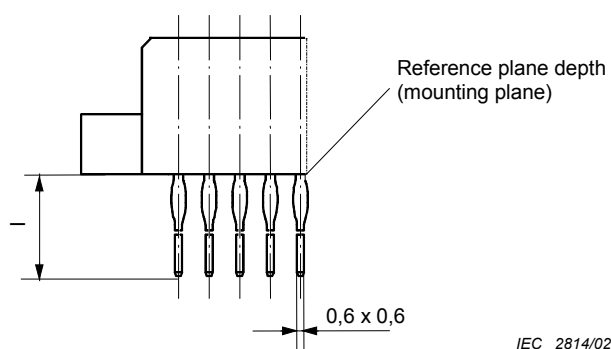


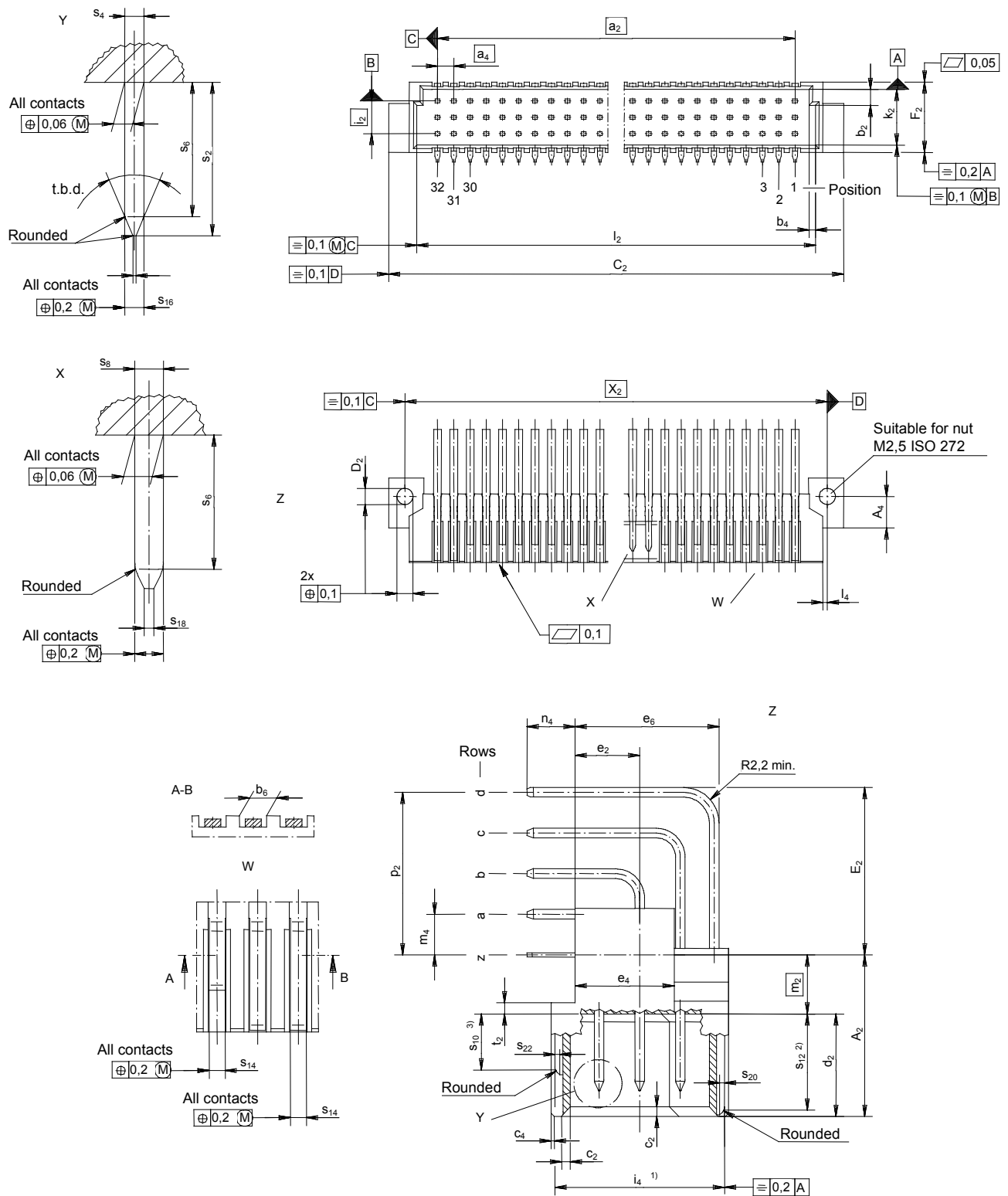
Figure 11 – Terminations

Table 5 – Dimension of the termination

Type of termination	l mm
P	5
V	17

3.5 Free board connectors

3.5.1 Dimensions



IEC 2815/02

Figure 12 – Free board connector dimensions

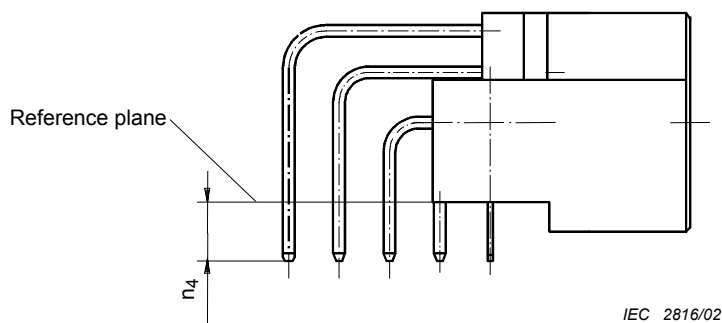
Table 6 – Free board connector dimensions

Reference letter	Dimension	Reference letter	Dimension	Reference letter	Dimension
A2	10,2 10,0	c4	0,2 min.	p2	4×2,54(=10,16)
A4	5,4 max.	d2	6,4 6,3	s2	5,0 4,8
C2	94 max.	e2	4,05 3,80	s4	0,61 0,56
D2	2,5 min.	e4	6,1 5,9	s6	4,4 4,2
E2	10,6 max.	e6	8,95 max.	s8	0,70 0,55
F2	11,1 max.	i2	2×2,54(=5,08)	s10 ^c	4,0 3,8
X2	88,9	i4 ^a	10,6 min.	s12 ^b	5,8 min.
a2	31×2,54(=78,74)	k2	8,7 8,6	s14	1,15 1,10
a4	2,54	l2	85,4 85,2	s16	0,15 max.
b2	2,5 2,3	l4	0,6 min.	s18	0,2 max.
b4	1,0 0,9	m2	3,75	s20	0,2 min.
b6	2,1 min.	m4	2,54	s22	0,2 min.
c2	0,7 0,6	n4	3,2 2,6	t2	0,8 0,7

^a Contact surface, contacts not protruding.
^b Contact point row d position 1, 2, 31, 32, only.
^c Contact point row d position 3 to 30 and row z position 1 to 32.

3.5.2 Terminations

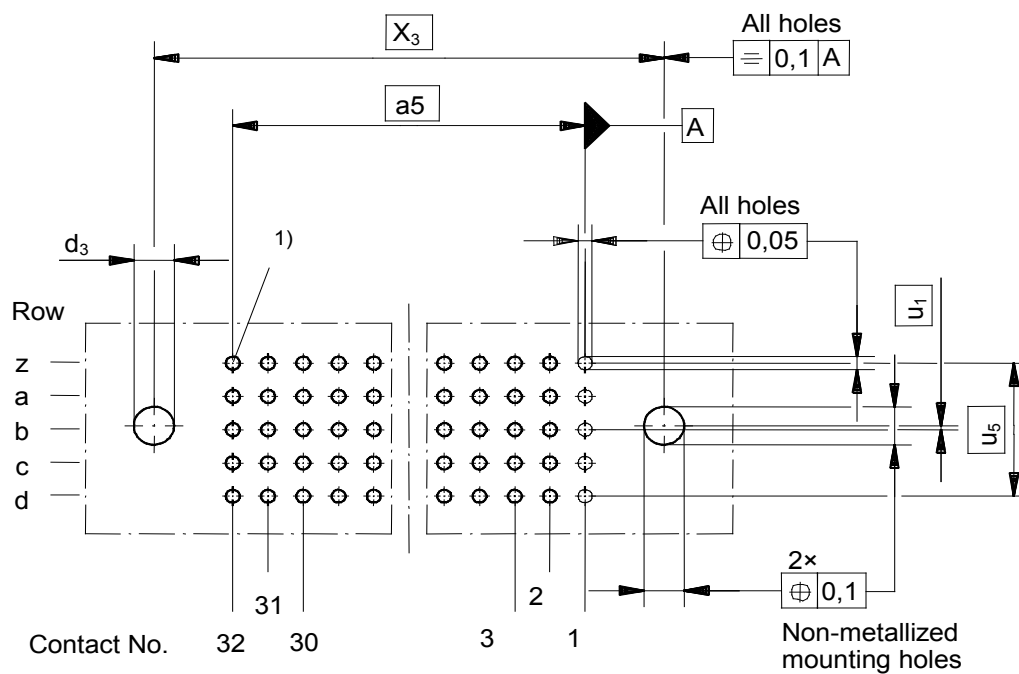
The terminations shall be suitable for holes of a 1 mm nominal diameter in accordance with IEC 60326-3.

**Figure 13 – Terminations**

3.6 Mounting information for fixed board connectors

3.6.1 Hole pattern on panels

Drawings: view on connector side of printed board.



NOTE All termination holes 1 mm nominal diameter and in accordance with IEC 60326-3.

1) For press-in terminations, plated-through holes shall be used.

Figure 14 – Hole pattern on panels

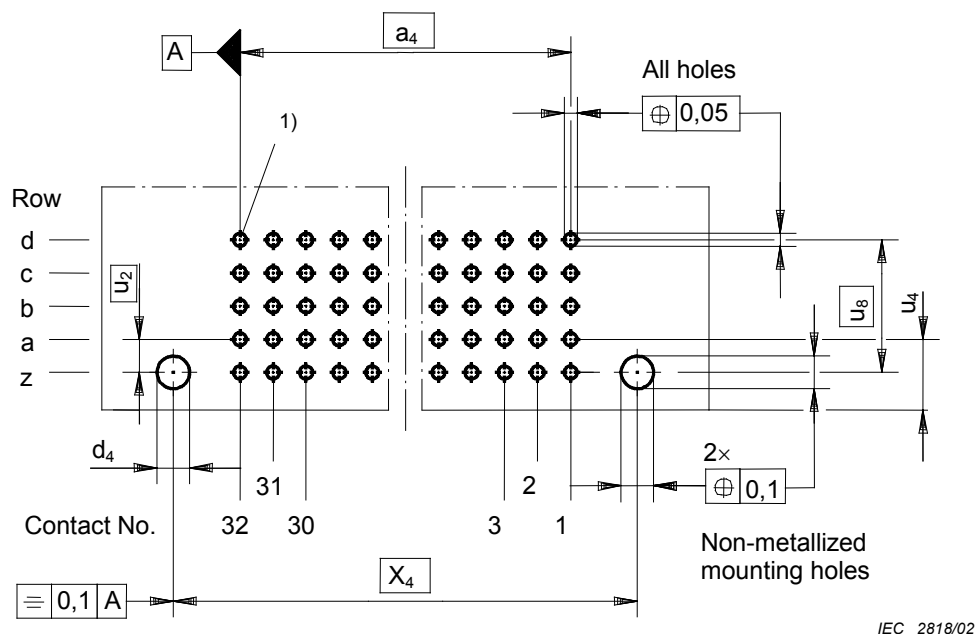
Table 7 – Hole pattern on panels

	X3	a5	d3	u1	u5
mm	90	31×2,54(=78,74)	2,9 2,8	0,3	4×2,54(=10,16)

3.7 Mounting information for free board connectors

3.7.1 Hole pattern on printed boards

Drawings: view on connector side of printed board.



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NOTE All termination holes 1 mm nominal diameter and in accordance with IEC 60326-3.

1) Plated-through holes are recommended.

Figure 15 – Hole pattern on printed boards

Table 8 – Hole pattern on printed boards

	X4	a4	d4	u2	u4	u8
mm	88,9	31×2,54(=78,74)	2,9 2,8	2,54	5,4 5,2	4×2,54(=10,16)