

Connectors for electronic equipment

**Part 4-101: Printed board connectors
with assessed quality — Detail
specification for two-part connector
modules, having a basic grid of 2,0 mm
for printed boards and backplanes in
accordance with IEC 60917**

ICS 31.220.10

National foreword

This British Standard is the UK implementation of EN 61076-4-101:2001. It is identical with IEC 61076-4-101:2001, incorporating corrigendum November 2003. It supersedes BS EN 61076-4-101:1998 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee EPL/48 Electromechanical components for electronic equipment, to Subcommittee EPL/48/2, Connectors for electronic equipment.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 23 November 2001

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ISBN 978 0 580 62318 9

Amendments/corrigenda issued since publication

Date	Comments
30 April 2008	Implementation of IEC corrigendum November 2003 (replacement of Figure 56)

Connectors for electronic equipment
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Detail specification for two-part connector modules, having a basic grid of
2,0 mm for printed boards and backplanes in accordance with IEC 60917
(IEC 61076-4-101:2001)

Connecteurs pour équipements
électroniques
Partie 4-101: Connecteurs pour cartes
imprimées sous assurance de la qualité -
Spécification particulière pour modules de
connecteurs en deux parties, au pas de
base de 2,0 mm, pour cartes imprimées et
fonds de panier selon la CEI 60917
(CEI 61076-4-101:2001)

Steckverbinder für elektronische
Einrichtungen
Teil 4-101: Steckverbinder für gedruckte
Schaltungen mit bewerteter Qualität -
Bauartspezifikation für indirekte
Steckverbindermodule im Raster 2,0 mm
für Leiterplatten und Rückplatten nach
IEC 60917
(IEC 61076-4-101:2001)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 48B/1065/FDIS, future edition 2 of IEC 61076-4-101, prepared by SC 48B, Connectors, of IEC TC 48, Electromechanical components and mechanical structures for electronic equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61076-4-101 on 2001-10-01.

This European Standard supersedes EN 61076-4-101:1998.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2002-07-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2004-10-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annex ZA is normative and annexes A and B are informative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61076-4-101:2001 was approved by CENELEC as a European Standard without any modification.

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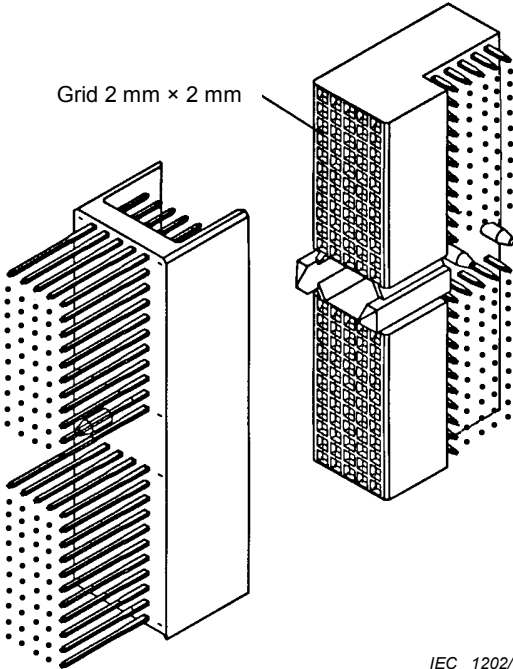
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CONNECTORS FOR ELECTRONIC EQUIPMENT –

Part 4-101: Printed board connectors with assessed quality –
Detail specification for two-part connector modules,
having a basic grid of 2,0 mm for printed boards
and backplanes in accordance with IEC 60917

IEC SC 48B: CONNECTORS Specification available from: IEC Central Office or from the addresses shown on the inside front cover. Electronic components of assessed quality	IEC 61076-4-101 QC 480301XX0002
DETAIL SPECIFICATION in accordance with IEC 61076-1:1995	Blank detail specification: IEC 61076-4-001:1996
 Grid 2 mm × 2 mm IEC 1202/01	Two-part connector modules for printed boards and backplanes, grid of 2,0 mm in accordance with IEC 60917.
	Stackable connector modules, five rows (shown) and eight rows, 50 mm (and 25 mm) long, with optional coding, shielding and cavities for special contacts.
	Performance levels (PL): 1, 2, 3 Assessment levels: A and G Combinations of performance and assessment levels: 1G, 2A, 2G and 3A.

Information on the availability of components qualified to this detail specification is given in the qualified products list.

1 General data

Throughout this specification dimensions are in millimetres.

1.1 Recommended method of mounting

A complete connector consists of one or more connector modules which are stackable end to end, without loss of contact positions.

Guiding, coding, and mounting features are grouped in a multipurpose centre (called MPC throughout this specification).

Free board connector modules are mounted on the edge of the printed circuit board and have female contacts with angled press-in terminations.

Fixed board connector modules are mounted on the backplane and have male contacts with straight press-in terminations with optional solderless wrapping and/or rear plug-up contacts.

The gap between the backplane and the edge of the printed board is 12,5 mm.

The contact row b on the backplane is in line with the reference plane "width" of the printed board.

The termination row a on the printed board lies 1,5 mm from the edge and 14 mm from the backplane.

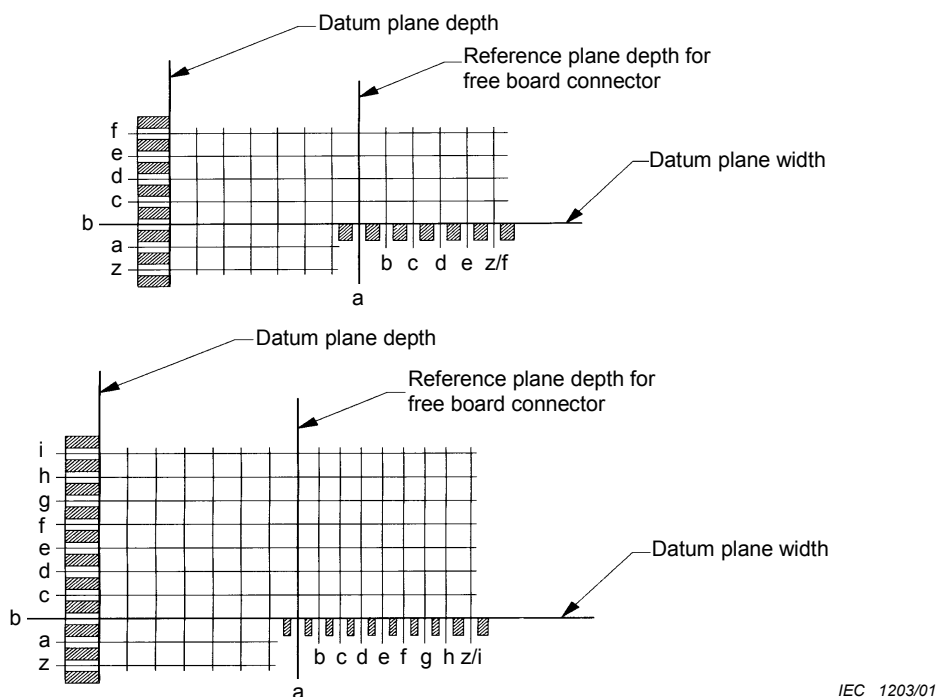


Figure 1 – Typical grid layout for 2,0 mm connector modules

1.1.1 Number of contacts and contact cavities

The connector modules have five or eight contact rows, and two optional grounding rows, which can be fully or partially loaded. 50 mm connector modules can have up to a maximum of 200 signal contacts and 50 additional grounding contacts.

Table 1 – Number of contact cavities per style

Style (see 2.2.1)	A/D	B/E	C/F	G	L	M	N
Cavities for contacts	110/176	125/200	55/88	–	–	55	–
Cavities for grounding contacts	44/44	50/50	22/22	–	–	22	–
Cavities for special contacts	–	–	–	6	6	3	3

1.2 Ratings and characteristics

Rated voltage:	contact/contact 500 V r.m.s.
Current rating:	1 A at 70 °C (all signal contacts loaded)
Insulation resistance:	10 ⁴ MΩ minimum
Climatic category:	PL1: 55/125/56 PL2: 55/125/21 PL3: 55/125/00
Printed board:	diameter of plated-through hole: 0,55 mm to 0,65 mm thickness of backplane: 1,4 mm to 5,6 mm thickness of printed board: 1,4 mm to 4,2 mm

1.3 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61076. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 61076 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

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

IEC 60086 (all parts), *Primary batteries*

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

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

IEC 60410:1973, *Sampling plans and procedures for inspection by attributes*

IEC 60512 (all parts), *Electromechanical components for electronic equipment – Basic testing procedures and measuring methods*

IEC 60917-1, *Modular order for development of mechanical structures for electronic equipment practices – Part 1: Generic standard*

IEC 60917-2-2, *Modular order for development of mechanical structures for electronic equipment practices – Part 2: Sectional specification – Interface co-ordination dimensions for the 25 mm equipment practice – Section 2: Detail specification – Dimensions for subracks, chassis, backplanes, front panels and plug-in units*

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*

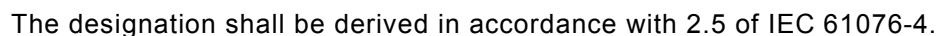
IEC 61076-4:1995, *Connectors with assessed quality, for use in d.c., low-frequency analogue and in digital high speed data applications – Part 4: Sectional specification – Printed board connectors*

ISO 1302:1992, *Technical drawings – Method of indicating surface texture*

1.4 Marking

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

See 2.1 for definitions and 2.2 for designation of styles and variants.



Example for connector modules:

A five-row, 50 mm free connector module with MPC, fully loaded with palladium and gold-flash plated contacts in rows a, b, c and d with 90° angled press-in terminations, meeting performance level 2 and assessment level G, is designated as follows:

IEC 61076-4-101 – A110F4100 – L122G

Example for accessories:

A coding device for free board connector modules, with the code number 1247 (which means it has blocking pins on the coding positions 1, 2, 4 and 7), meeting performance level 1 and assessment level G, is designated as follows:

IEC 61076-4-101 – K000F1247 – Z001G

Example for single contacts:

A single male contact, to be pressed into holes of Ø 0,6 mm and 16 mm long, with rear plug-up contact, a contact length of level 2, palladium and gold-flash plated, meeting performance level 1 and assessment level G, is designated as follows:

IEC 61076-4-101 – S001M0020 – R121G

1.6 Ordering information

For ordering connector modules according to this detail specification, the IEC type designation described in 1.5 shall be used.

2 Technical data**2.1 Definitions**

For the purpose of this part of IEC 61076, the following definitions apply.

2.1.1 Mechanical features**2.1.1.1****connector modules**

building blocks, containing all features of a connector, being mounted end to end on a printed board or a backplane, thus forming a larger connector

2.1.1.2**stackable module**

connector modules mounted end to end without loss of contact positions

2.1.1.3**MPC (multipurpose centre)**

area in the connector module, locating most of the mechanical utilities, for example the extended guiding, the centering, the location pegs, the wall stiffeners, the cavities for the coding devices, the polarization

2.1.1.4**location pegs**

posts, protruding from the connector housing, fitting into corresponding holes in the printed board or backplane, preventing a wrong assembly, and giving an accurate position and additional attachment

2.1.2 Contacts and terminations**2.1.2.1****contact range**

minimum to maximum distance between the reference planes of the fixed and free board connectors, within which the specified contact resistance shall be met

2.1.2.2**chess pattern**

contact arrangement where the loaded and the unloaded positions alternate in rows and columns, like the fields on a chess-board

2.1.2.3**chess pattern, odd in a**

contact arrangement having loaded contacts on odd positions in row a

2.1.2.4

acronym in French only

2.1.2.5**rear plug-up contact**

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

2.1.2.6**press-in shoulders**

flanges on both sides of the male contact, supporting the mechanical forces to press the contact into the backplane

2.1.2.7**grounding rows**

contact rows z and f for the five-row version, and z and i for the eight-row version of the fixed board connector, always being connected to zero volts, and only being used to contact the optional shielding frames (see 2.3.5)

2.1.3 Engagement sequence**2.1.3.1****contact level**

group of contacts which engage/separate simultaneously, within the limits required by a secure engaging sequence

2.1.3.2**engaging sequence**

distinct order in the engaging/separating process of contacts belonging to different contact levels

2.1.3.3

first possible contact point

depth dimension of the first point on the female contact, which can possibly be touched by the incoming male contact

2.1.3.4

first reliable contact point

depth dimension of the first point on the female contact, from where the specified contact resistance with the incoming male contact is met

2.1.4 Mechanical coding

2.1.4.1

coding devices

accessories allowing the user to make specific pairs of connectors by providing them with matching coding devices

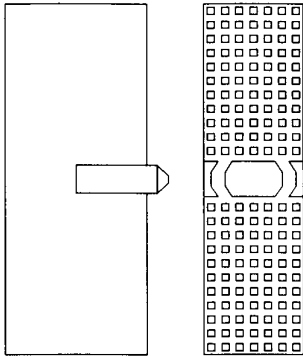
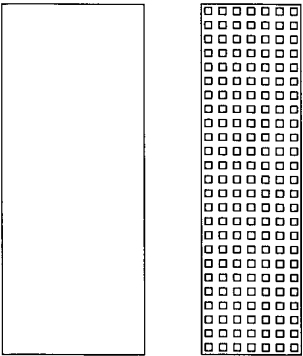
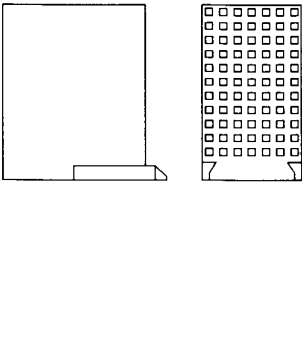
NOTE Only connector pairs equipped with matching coding devices are intermateable, pairs with interfering coding devices are blocked off during insertion, preventing all electrical contact.

2.2 Surveys of styles and variants

2.2.1 Styles of connector modules

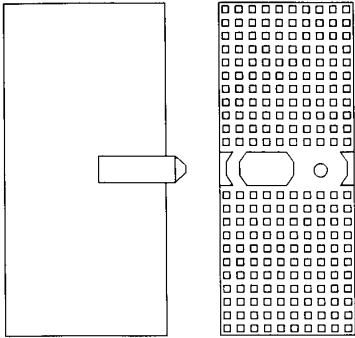
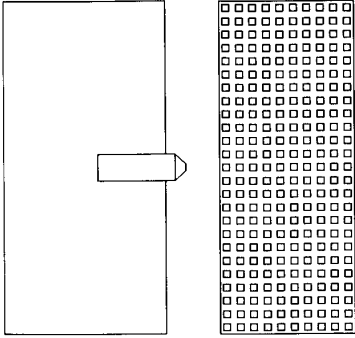
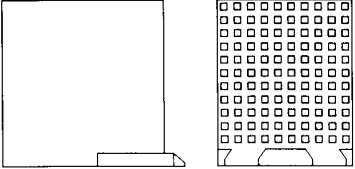
Styles are only defined as being styles of connector modules. Complete connectors can be composed in many different ways, according to 2.3.1.

Table 2 – Survey of styles A, B and C

A	B	C
50 mm with MPC	50 mm without MPC	25 mm extension module
		

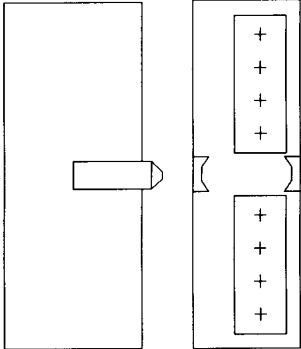
IEC 1204/01

Table 3 – Survey of styles D, E and F

D	E	F
50 mm with MPC	50 mm without MPC	25 mm extension module
		

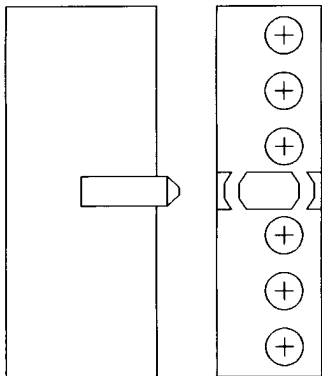
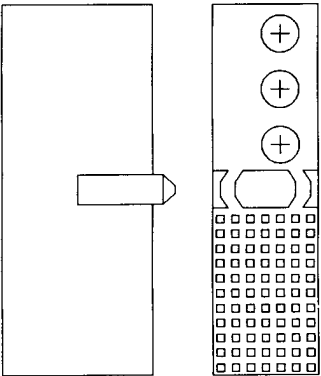
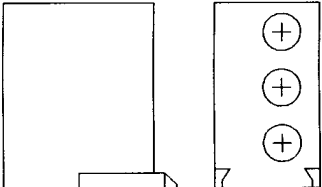
IEC 1205/01

Table 4 – Survey of style G

G
50 mm with eight special contacts


IEC 1206/01

Table 5 – Survey of styles for special contacts

L	M	N
50 mm with six special contacts	50 mm mixed module with three special contacts	25 mm extension module with three special contacts
		

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2.2.2 Survey of termination variants

Table 6 – Termination variants

	Basic type of termination	Variant	Length (see 3.4.3 and 3.5.3)
L	90° angled, solderless, compliant press-in connection for plated-through hole Ø 0,6 according to IEC 60352-5	L1	3,5
P	Straight, solderless, compliant press-in connection for plated-through hole Ø 0,6 according to IEC 60352-5	P1	4,5
		P2	3,7
R	Straight, solderless, compliant press-in connection for plated-through hole Ø 0,6 according to IEC 60352-5, for wrap connections according to IEC 60352-1, with rear plug-up contact area	R1	16
		R2	14,5
		R3	13
U	Straight, solderless, compliant press-in connection for plated-through hole Ø 0,6 according to IEC 60352-5, for wrap connections according to IEC 60352-1	U1	13

2.2.3 Survey of coding devices

Each set of matching coding devices shall be moulded in a specific colour. Combinations of colours and code numbers are listed in annex B.

The references to RAL (the German institute for colour codes and samples) are given for information only.

2.3 Information on application

2.3.1 Complete connectors (pairs)

Description

A complete connector is composed by stacking one or more connector modules end to end.

All the styles of modules can be stacked at random, but the configuration of the completed fixed and free board connector shall be identical.

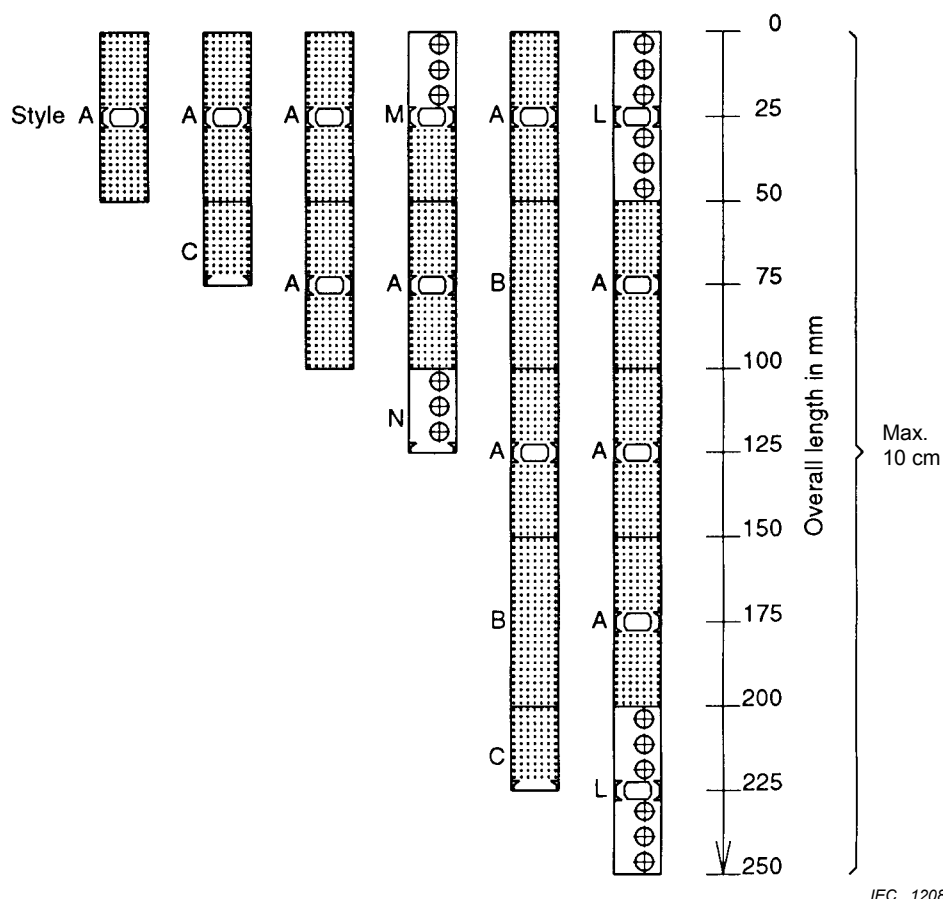
All modules are 50 mm long, except for the extension modules (styles C, F and N), which are 25 mm long and shall only be added at one end of a connector in order to build connectors with an overall length in odd multiples of 25 mm.

Every style of module with an integrated MPC has all the features of a complete connector and can be used on its own.

Restrictions

To fulfil the mating characteristics in 3.3, the modular concept has some restrictions on how to compose a complete connector:

- a module without MPC (style B), shall only be used between modules with MPC, otherwise it cannot cope with the transverse and angular misalignment allowed (see 3.3.2 and 3.3.3);
- extension modules (styles C, F and N) shall only be used at the bottom end of the connector, together with at least one module with MPC.

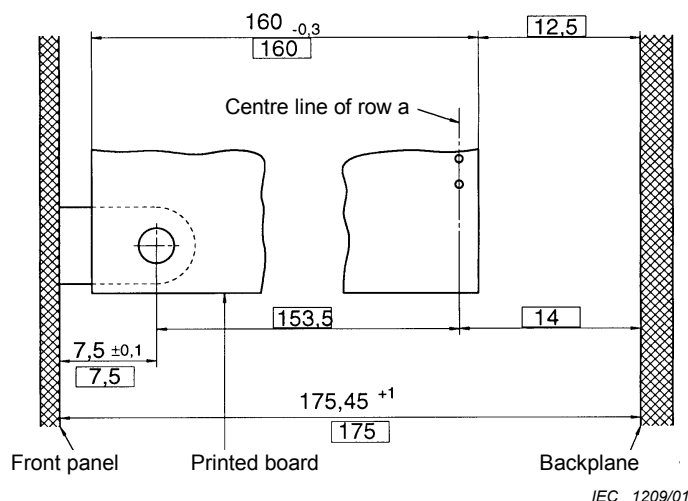


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Figure 2 – Examples of complete connector arrangements

Metric equipment practice

The specified contact range $M = 14 \text{ mm}$ to $16,5 \text{ mm}$ (see 3.3.1), covers actual tolerances within the 25 mm equipment practice, and allows a further $0,3 \text{ mm}$ maximum bow of the backplane towards the front, and $0,9 \text{ mm}$ maximum towards the back.



NOTE For a clear comprehension of the interaction of the tolerances, the dimensions shown refer to an example of a 175 mm deep subrack ($D_s = 175$ in IEC 60917-2-2).

Figure 3 – Co-ordination dimensions and their tolerances in the 25 mm metric equipment practice

2.3.2 Fixed board connectors

Polarization

Fixed board connector modules can be mounted in only one way on the backplane. The location peg on the rear of the MPC shall fit into a hole in the printed board to prevent wrong assembly.

Fixed board connector modules without MPC (style B/E) are polarized at their ends and fit only one way between adjacent modules.

Mounting

The fixed board connector modules are attached to the backplane by means of location pegs.

Grid on the backplane

When the connector is used in packing densities 20 mm ($4 \times 5 \text{ mm}$), 30 mm ($6 \times 5 \text{ mm}$) or other even figures, then the grid on the backplane will continuously be 2 mm.

When the connector is used in odd packing densities like 15 mm ($3 \times 5 \text{ mm}$), then the grid on the backplane will be 2 mm around the reference plane of each connector, but between adjacent connectors there will be a discontinuity of 1 mm in the 2 mm grid.

Use of contact levels and sequencing

The contact levels shall allow a safe engaging sequence, therefore the male contacts for the fixed board connector module are specified in three contact levels, staged by 1,5 mm.

NOTE Contact row b should be loaded only with male contacts level 1 and 2. This is because the available insertion depth of the free board connector is restricted in contact row b by the edge of the printed board.

Arrangement of the different contact levels in the connector.

The allowed **inclination** of the mating connectors (see 3.3.3) affects the engaging sequence. To neutralize the effect of the inclination the contacts of the concerned level shall be located at the **outer corners** of the completed connector.

Also the **bow** of the backplane/connector assembly and **bending** during the engaging/separating operation affect the engaging sequence. To neutralize the effect of the bending, the contacts of the level concerned shall be **distributed along** the complete connector.

2.3.3 Free board connectors

Polarization

Free board connector modules have non-symmetrical guiding pins on the MPC, to prevent wrong engagement.

Mounting

The free board connector modules are mounted along the edge of the printed circuit board and attached by means of location pegs.

If the free board connector modules are held well enough on the printed board by their press-in terminations, so that they can withstand all mechanical stress during operation, the location pegs may be omitted (see 4.3.4).

Engaging sequence

The first possible contact point on the female contacts shall meet the required dimensions of 3.5.2. This shall be checked with a gauge (see 3.9.2), which simulates the maximum space a male contact can occupy within the aperture of the free board connector. An appropriate test is in preparation.

2.3.4 Accessories

2.3.4.1 Special contacts

Connector module styles L, M, and N contain cavities to receive special contacts, with a reference diameter of 4,8 mm. No international standard specifying these contacts is available. Specific information, which is not normative, is given in annex A.

2.3.4.1.1 Fibre optic contacts

Connector module G contains six (6) cavities to accommodate one to six fibre optical connectors (see IEC 60086).

2.3.4.2 Coding devices

Description

Each coding device is a one-piece moulding with a specific configuration of blocking pins. From the eight available coding positions, four are filled with blocking pins, and four are left open to let the opposite pins pass through. This arrangement allows a choice of 70 different combinations. The coding positions are numbered from 1 to 8; the ciphers are marked on top of the four blocking pins, thus composing a four-figure code number, sorted from low to high (example 1 2 4 7).

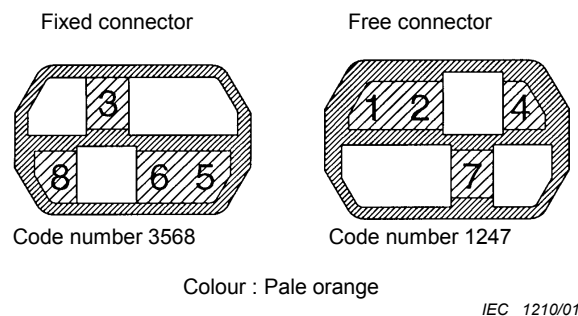


Figure 4 – Example of matching coding devices

Mounting

The coding devices are clicked into the MPCs of the connector modules. They shall be extractable from a mounted connector by means of a special tool.

The devices are polarized and have different clicking latches for fixed and free modules.

Each set of matching coding devices shall be moulded in a specific colour. This permits straightforward handling while coding the connectors and easy spotting of failures in the completed equipment.

All interface dimensions of the coding devices and the MPCs are specified. This allows full intermateability and interchangeability between different sources.

Blocking

Interfering coding devices shall block off the insertion operation of the connector before any electrical connection is made.

Each blocking pin shall withstand an insertion force of 100 N (see 4.3.9). The completed connector shall be equipped with identical coding devices in all MPCs, to make them block simultaneously.

An inclination of the printed board in the blocked position would reduce the blocking distance; for the same reason, identical coding devices shall be mounted.

2.3.5 Shielding and grounding

The shielding function is not part of this specification. The only purpose of this subclause is the option of adding shielding frames to the connector, without affecting intermateability.

Description

Both sides of the free board connector can be shielded with metal plates, which engage with the grounding rows z and f for the five-row version and z and i for the eight-row version of the fixed board connector.

This arrangement offers extra grounding contacts for high-speed applications, without claiming full shielding of electromagnetic interferences.

The grounding and shielding contacts shall meet all the mating conditions specified in 3.3.

To meet the contact range, the grounding rows in the fixed board connector shall be equipped with male contacts level 3.

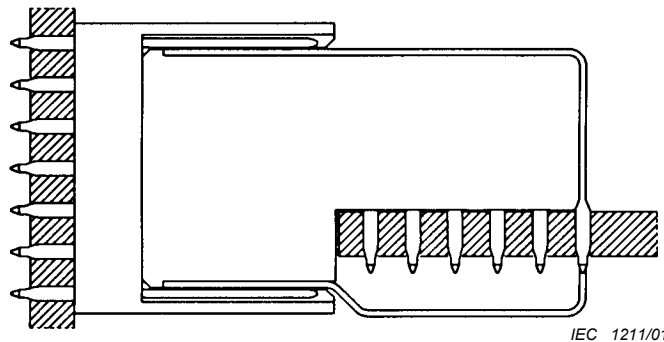


Figure 5 – Example of grounding and shielding arrangement

Intermateability

Connectors with and without shielding and grounding shall be intermateable.

The contact force shall be determined by the flexibility of the grounding rows and the housing walls of the fixed board connector on one side, and by the spring contact characteristics of the shielding frames on the other side.

The flexibility of the grounding rows and the spring characteristics of the shielding frames shall be tested with the retention force gauges specified in 3.9.1.

Dimensions

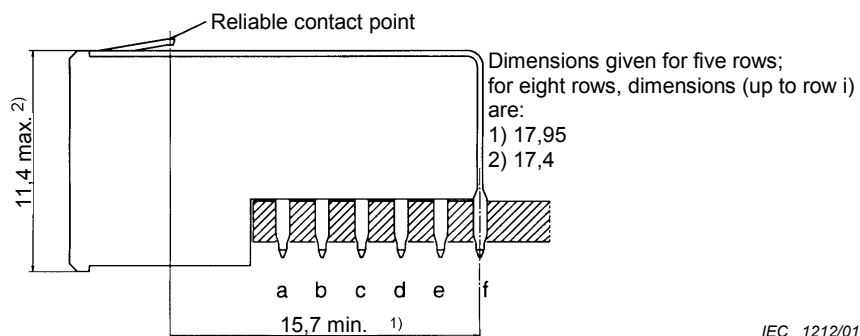


Figure 6 – Mating dimensions of shielding frame for row f (five rows) and i (eight rows)

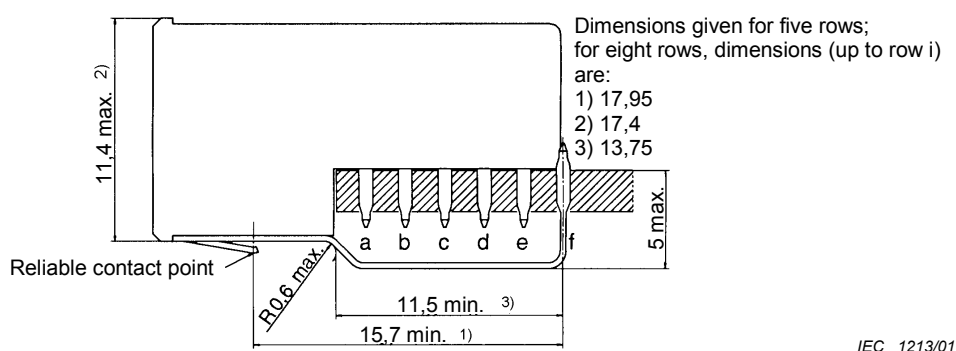


Figure 7 – Mating dimensions of the shielding frame for row z

The length of the shielding frames is not specified and depends on the application.

These specifications permit full mechanical compatibility among fixed and free board connectors from different sources with the grounding and shielding option.

2.3.6 Basic type of termination

Application tools

The fixed board connector modules are provided with lead-in chamfers to guide the press-in tool.

The press-in shoulders on the male contacts are specified to allow the construction of compatible press-in tools.

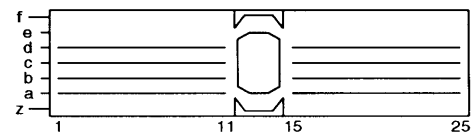
2.4 Contact arrangements

NOTE Most patterns and arrangements are given up to five rows; extensions of up to eight rows can be made in the same way.

The contact arrangements may be chosen according to four criteria, which also define the four relevant ciphers in the IEC type designation (see 1.5).

The first cipher specifies the rows which are loaded with contacts:

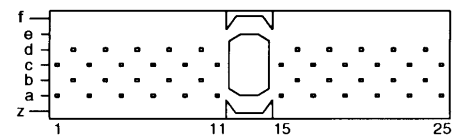
1. rows a + c + e
2. rows b + d
3. rows a + b + c
4. rows a + b + c + d
5. rows a + b + c + d + e
6. rows a + b + c + d + e + f + g + h



Example: rows 4

The second cipher describes the loading pattern applicable to all contacts:

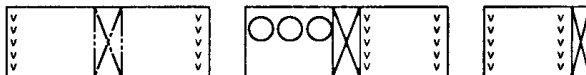
1. fully loaded
2. all even-numbered contacts
3. all odd-numbered contacts
4. chess pattern even-numbered in row a
5. chess pattern odd-numbered in row a



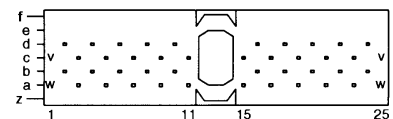
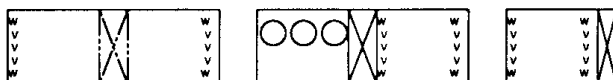
Example: rows 4, pattern 5

The third cipher adds the loading pattern applicable to the contact levels (only for fixed board connector modules):

1. all contacts level 1
2. contacts level 2 (marked V) in columns at the end, all others level 1



3. contacts level 2 (marked V) in columns at the end, corners contacts level 3 (marked W), all others level 1

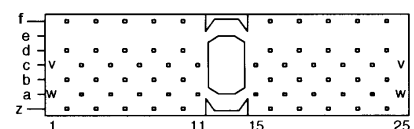


Example: rows 4, pattern 5, levels 3

NOTE Contact row b cannot be equipped with contacts level 3.

The fourth cipher specifies how the grounding rows of the fixed board connector modules are loaded:

1. fully loaded
2. all even-numbered contacts
3. all odd-numbered contacts



Example: rows 4, pattern 5, levels 3, grounding 2

The contact arrangements which are obtained through the combination of the first and second ciphers are shown in table 7.

**Table 7 – Examples of contact arrangements
(shown for five rows only)**

Pattern Rows		1 Fully loaded 1 2 3 4 5 6	2 All even- numbered contacts 1 2 3 4 5 6	3 All odd- numbered contacts 1 2 3 4 5 6	4 Chess pattern even-numbered in row a 1 2 3 4 5 6	5 Chess pattern odd-numbered in row a 1 2 3 4 5 6
1 a+c+e	a b c d e	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0		
2 b+d	a b c d e	0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0		
3 a+b+c	a b c d e	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0		
4 a+b+c+d	a b c d e	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0
5 a+b+c+d+e	a b c d e	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

The number of loaded contacts depends on the style, the loading pattern and the number of loaded contact rows. It is shown in table 8.

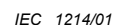
**Table 8 – Number of loaded contacts (shown for five rows only,
without grounding rows)**

	Pattern	1 Fully loaded	2 All even- numbered contacts	3 All odd- numbered contacts	4 Chess pattern even-numbered in row a	5 Chess pattern odd-numbered in row a
Rows	Style (see 2.2.1)	A B C M	A B C M	A B C M	A B C M	A B C M
1	a+c+e	66 75 33 33	30 36 15 15	36 39 18 18	– – – –	– – – –
2	b+d	44 50 22 22	20 24 10 10	24 26 12 12	– – – –	– – – –
3	a+b+c	66 75 33 33	30 36 15 15	36 39 18 18	– – – –	– – – –
4	a+b+c+d	88 100 44 44	40 48 20 20	48 52 24 24	44 50 22 22	44 50 22 22
5	a+b+c+d+e	110 125 55 55	50 60 25 25	60 66 30 30	54 62 27 27	56 63 28 28

3.1 General

All drawings are shown in first-angle projection. The shape of the connectors may deviate from that given in the following drawings, as long as the specified dimensions are not influenced.

3.2 Isometric view and common features



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3.2.1 Common features

**Table 9 – Co-ordination dimensions and common features
in metric equipment practice**

Dimension		Feature description
Reference	mm	
<i>H</i>	$n \times 25$	Maximum overall height of the completed connector
<i>D</i>	12,5	Depth co-ordination dimension: distance between edge of printed board and backplane
<i>M</i>	14 to 16,5	Contact range in engaging direction (see 3.3.1)
<i>V</i>	$m \times 50$	Co-ordination dimension from datum plane "height" to centre of first module
<i>b</i>		Datum plane "width" defined by the centre line of row b
<i>a</i>		Depth co-ordination plane on printed board is centre of connection holes of row a
<i>s</i>	1,5	Distance from edge of printed board to centre of connection holes of row a

3.2.2 Reference system

The connector modules can be used in any kind of equipment, but throughout this specification the reference system is the 25 mm metric equipment practice according to IEC 60917-2-2.

All co-ordination dimensions are based upon the 0,5 mm modular grid and the 25 mm and 2,5 mm mounting pitches specified in IEC 60917.

3.2.3 Height dimensions

Table 10 – Height dimensions, examples of complete connectors

Overall height <i>H</i> in mm	50	75	100	125	150	225	250
25 mm $\times$ factor <i>n</i>	2	3	4	5	6	9	10
Number of modules of 50 mm	1	1	2	2	3	4	5
Extension module of 25 mm	no	yes	no	yes	no	yes	no

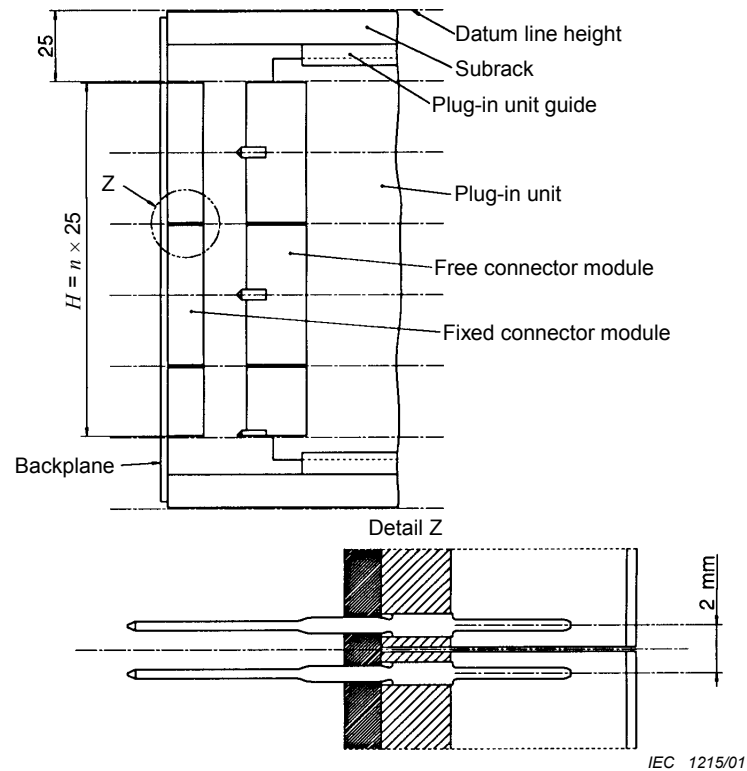


Figure 9 – Height dimensions, modular pitch of 25 mm

3.2.4 Width dimensions

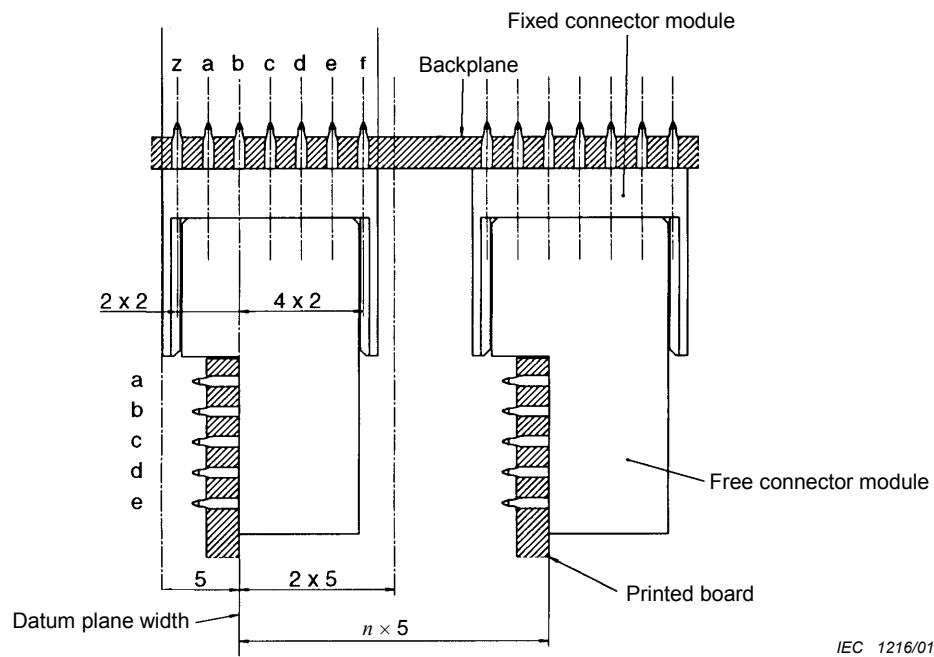
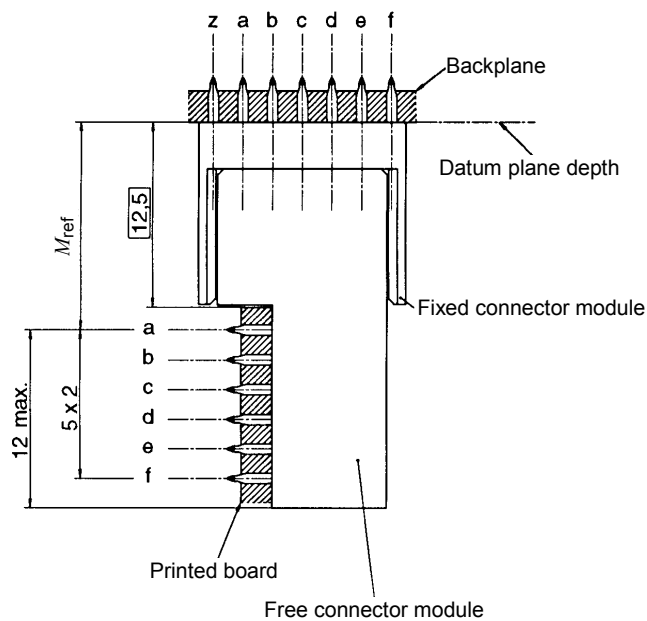


Figure 10 – Width dimensions, modular pitches

3.2.5 Depth dimensions



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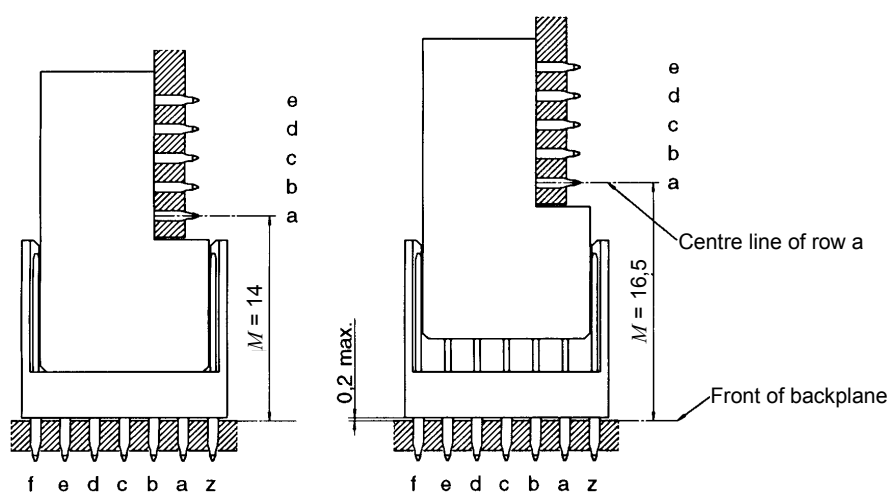
Co-ordination dimension $M_{ref} = 7 \times 2 \text{ mm} = 14 \text{ mm}$

Figure 11 – Depth dimensions

The co-ordination dimension M_{ref} is theoretical. In practice, the manufacturing tolerances in the whole equipment do not always permit full insertion of the connector. The contact range specifies the depth dimensions of the electrical engagement (see 3.3.1).

3.3 Mating information

3.3.1 Engaging direction



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Figure 12 – Contact range