

Connectors for frequencies below 3 MHz for use with printed boards —

Part 9: Two-part connectors for printed boards, backpanels and cable connectors, basic grid of 2,54 mm (0,1 in)

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British Standard

ICS 31.220.10

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 68 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Amendments issued since publication

Amd. No.	Date	Comments

This British Standard, having been prepared under the direction of the Electrotechnical Sector Board, was published under the authority of the Standards Board and comes into effect on 15 May 1998

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Descriptors: Electronic components, electric connectors, printed-circuit cards, connector plugs, designation, dimensions, assembling, couplings, tests

English version

Connectors for frequencies below 3 MHz for use with
printed boards
Part 9: Two-part connectors for printed boards, backpanels
and cable connectors, basic grid of 2,54 mm (0,1 in)

(IEC 60603-9:1990)

Connecteurs pour fréquences inférieures
à 3MHz pour utilisation avec cartes imprimées
Partie 9: Connecteurs pour cartes imprimées
enfichables, connexions fond de panier et
connecteurs de câble, pour grille de base
de 2,54 mm (0,1 in)
(CEI 60603-9:1990)

Stekverbinder für gedruckte
Schaltungen für Frequenzen
unter 3MHz
Teil 9: Indirekte Steckverbinder für
gedruckte Schaltungen, Rückplatten und
Kabelanschluß
Rastermaß 2,54 mm (0,1 in)
(IEC 60603-9:1990)

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

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

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Foreword

The text of the International Standard IEC 60603-9:1990, prepared by SC 48B, Connectors, of IEC TC 48, Electromechanical components and mechanical structures for electronic equipment, was submitted to the formal vote and was approved by CENELEC as EN 60603-9 on 1998-01-01 without any modification.

- 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) 1998-12-01
 - latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1998-12-01

Annexes designated “normative” are part of the body of the standard.
In this standard, Annex ZA is normative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60603-9:1990 was approved by CENELEC as a European Standard without any modification.

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1 Scope

This standard covers a group of related two-part connectors for printed boards and cable connectors associated with printed backpanels. The group covers high-density connectors having up to 96 miniature contacts for low-voltage applications, hereinafter called “signal contacts”, connectors having up to 6 high current contacts, hereinafter called “power contacts”, combined with up to 42 signal contacts and a range of 4, 10, 20 and 64 way female cable connectors and associated male parts for making connection to the backpanel or to the printed board (see Figure 1 and Figure 2, pages 6 and 7).

The board-mounted connectors with female contacts are provided with terminations suitable for printed boards in accordance with IEC Publication 326 and using a grid of 2,54 mm (0,100 in) as laid down in IEC Publication 97.

A first range of fixed connectors with male signal contacts is assembled on the backpanel by signal contacts and moulded housings. These male signal contacts have compliant press-in sections (optional additional soldering) suitable for use in backpanels with a grid of 2,54 mm (0,100 in) according to IEC Publication 97. (The press-in technique is under consideration.)

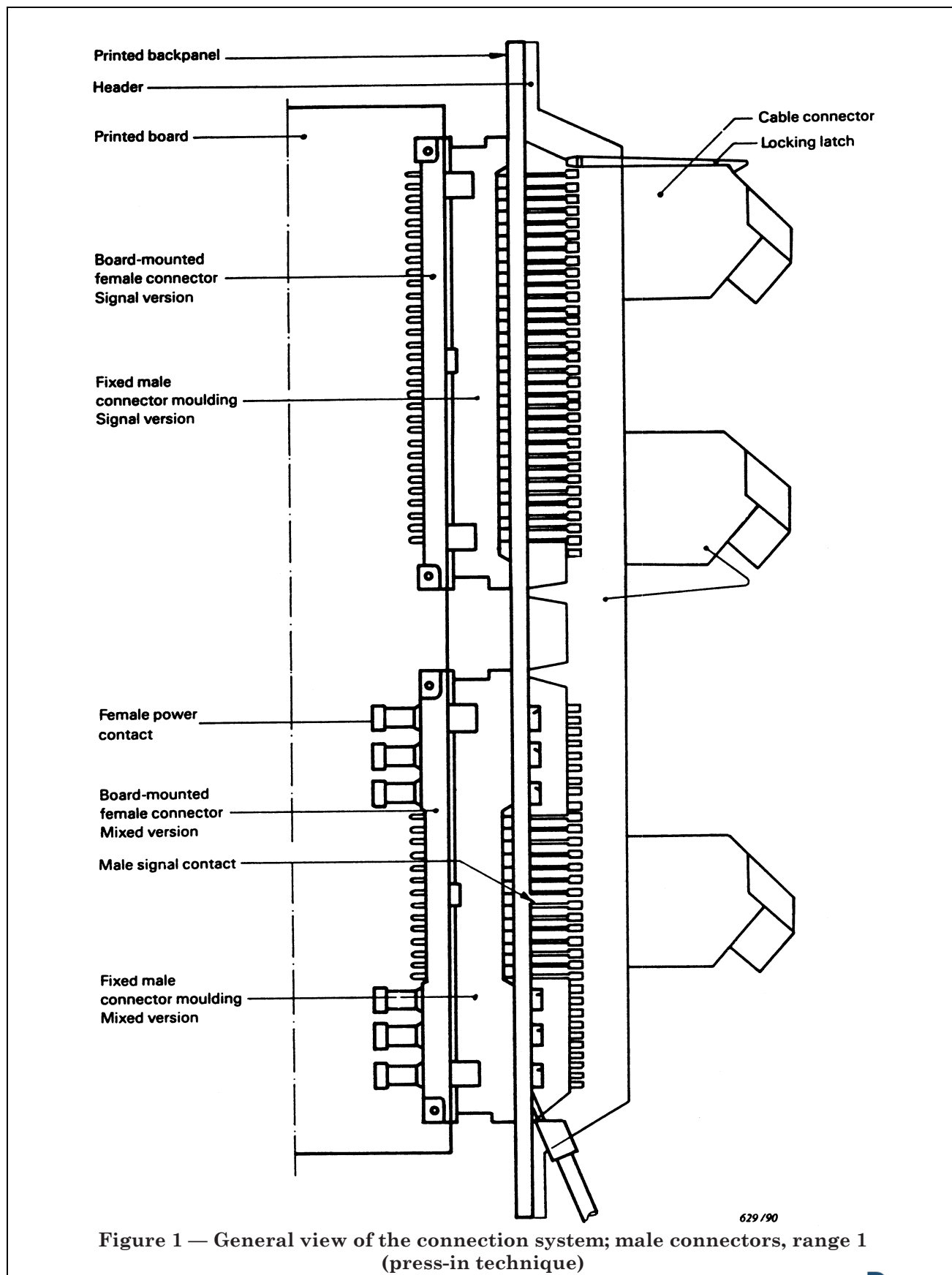
The individual male contacts are suitable for additional wrapping (see Figure 1).

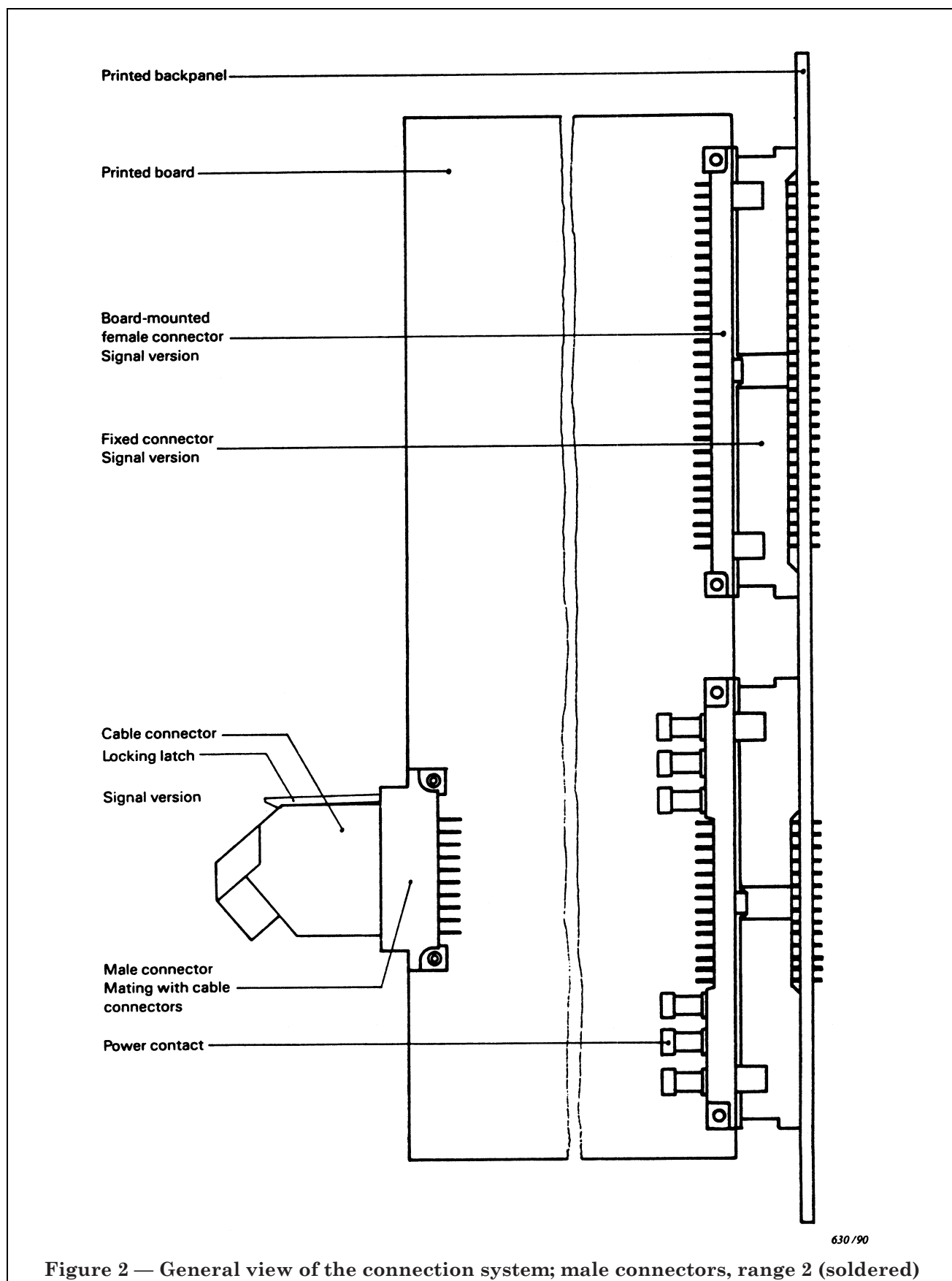
A second range of independent male connectors with solder terminals for printed back-panel mounting is included (see Figure 2).

First-to-make contact facilities can be provided on the connection between the printed board and the backpanel.

The two-row cable connectors are intended to connect round cables having up to 64 cores of 0,25 mm (0,010 in) or 0,5 mm (0,020 in) diameter conductors. Connections are made with the insulation displacement technique (under consideration for specification). Furthermore, male connectors for printed board mounting to mate with these cable connectors are included (see Figure 2).

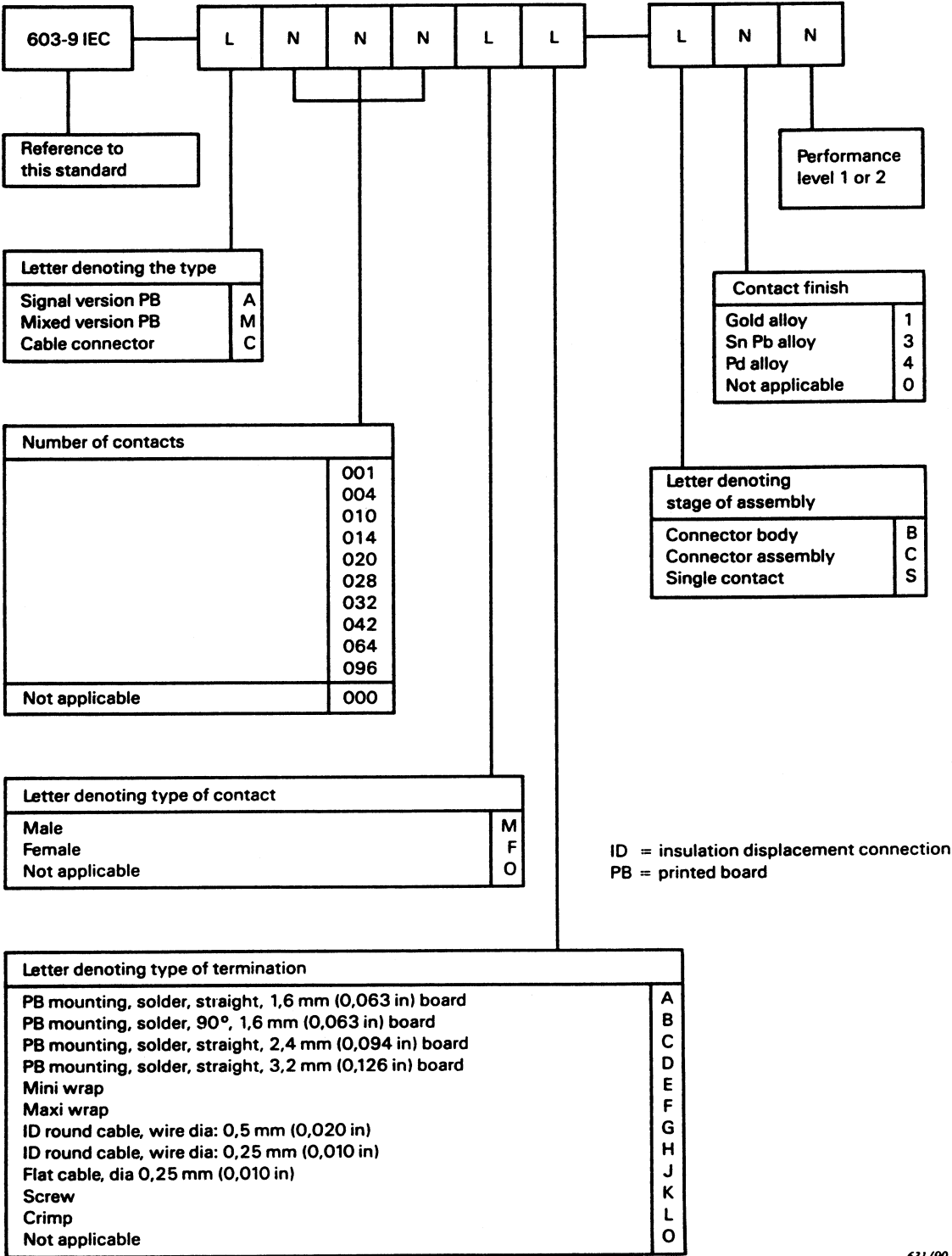
This standard shall be used in conjunction with IEC Publications 50(581), 97, 194, 326, 352-1, 512, 603-1 and 603-2.





2 IEC type designation

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



NOTE "L" stands for letter; "N" stands for number.
Example: Connector type A having 96 female contacts gold finished with solder terminations bent 90° for 1,6 mm (0,063 in) nominal thickness boards, performance level 1:603-9 IEC-A096 FB-C1-1.
NOTE In Clause 4, type designations show an "X". This means that the feature is variable.

631/90

3 Common features

3.1 Mounting dimensions

3.1.1 Reference system

A line in the mounting plane of the fixed connector and passing through the nominal position of the centres of row “b” male contacts is used as datum line, Figure 3 and Figure 4, pages 10 and 11. The dimensions in Sub-clauses 3.1.2 and 3.1.3 are defined with respect to this datum.

3.1.2 Fixed connector

a) General

For the basic concept of the fixed connector, the male signal contacts have compliant centre-sections for insertion into a backpanel of thickness 3,2 mm (0,126 in). There is the option of using the solderless press-in technique or soldering the contact to the backpanel. The choice depends upon the backpanel hole dimensions and finish, and upon the preference of the user. The male power contacts are inserted in the male contact housing and fixed to the backpanel by screws which also secure appropriate termination devices. The moulded housing has no fixing holes but is retained by an interference fit on the male signal contacts.

Additionally, an independent male connector with straight solder terminations for back-panels 2,4 mm (0,094 in) thick is included.

b) Position of the contacts and terminations

The distances between centres of the contacts are 2,54 mm (0,100 in) or multiples thereof in the X and Y axes. The terminations of the press-in contacts shall be located so as to permit automatic wiring techniques.

3.1.3 Printed board assembly

The following positions are shown in Figure 3 (connector system range 1) and Figure 4 (connector system range 2) and described in Table 1

- positions of the board-mounted female connectors;
- positions of the mounting holes of the board-mounted female connectors, see also Figure 30 and Figure 31, pages 44 & 45;
- position of the printed board;
- position of the grid of the printed board.

The terminations of the signal contacts of the board-mounted connectors shall fit into holes of printed boards according to IEC Publication 326 and shall be located on a grid of 2,54 mm (0,100 in) according to IEC Publication 97.

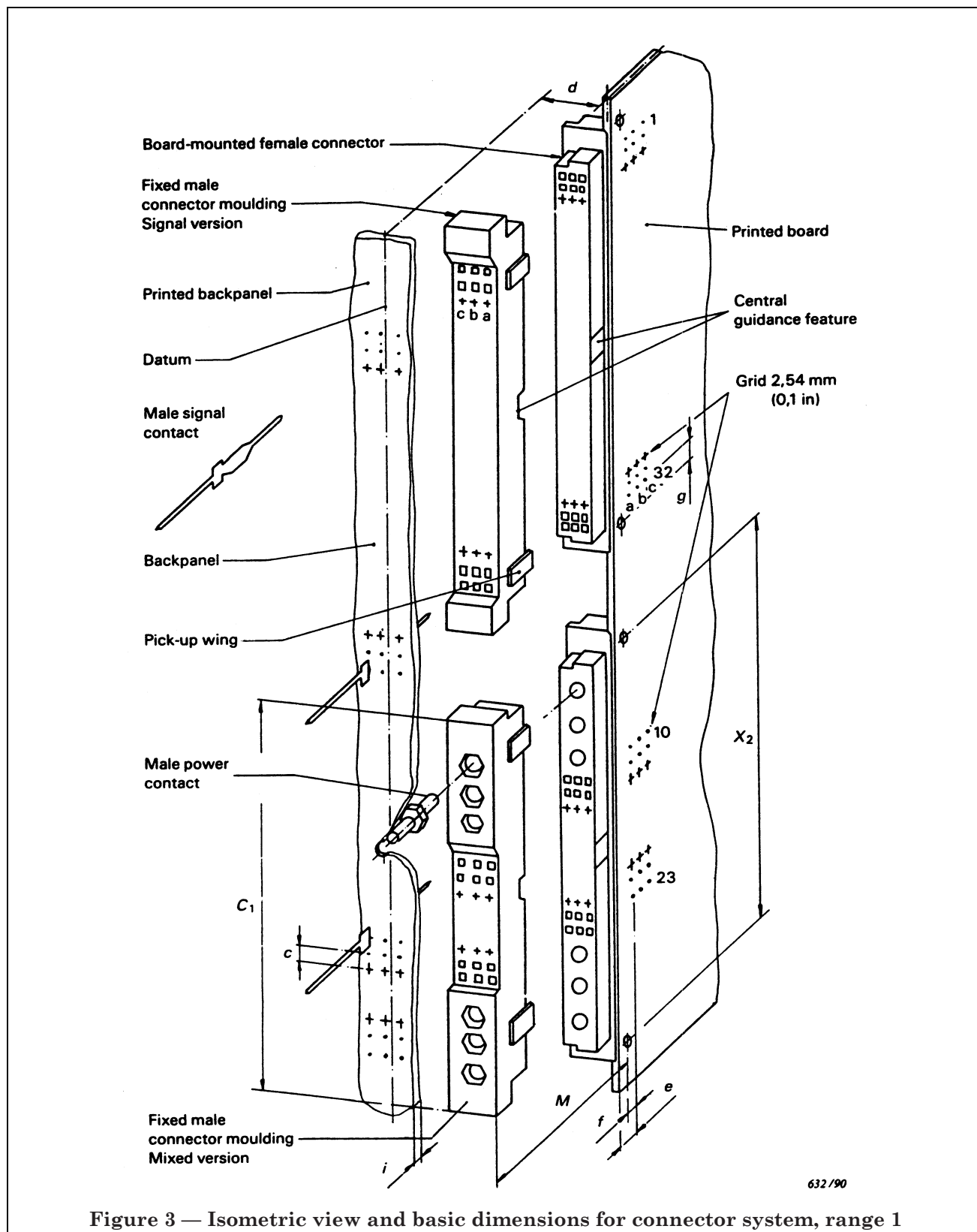


Figure 3 — Isometric view and basic dimensions for connector system, range 1

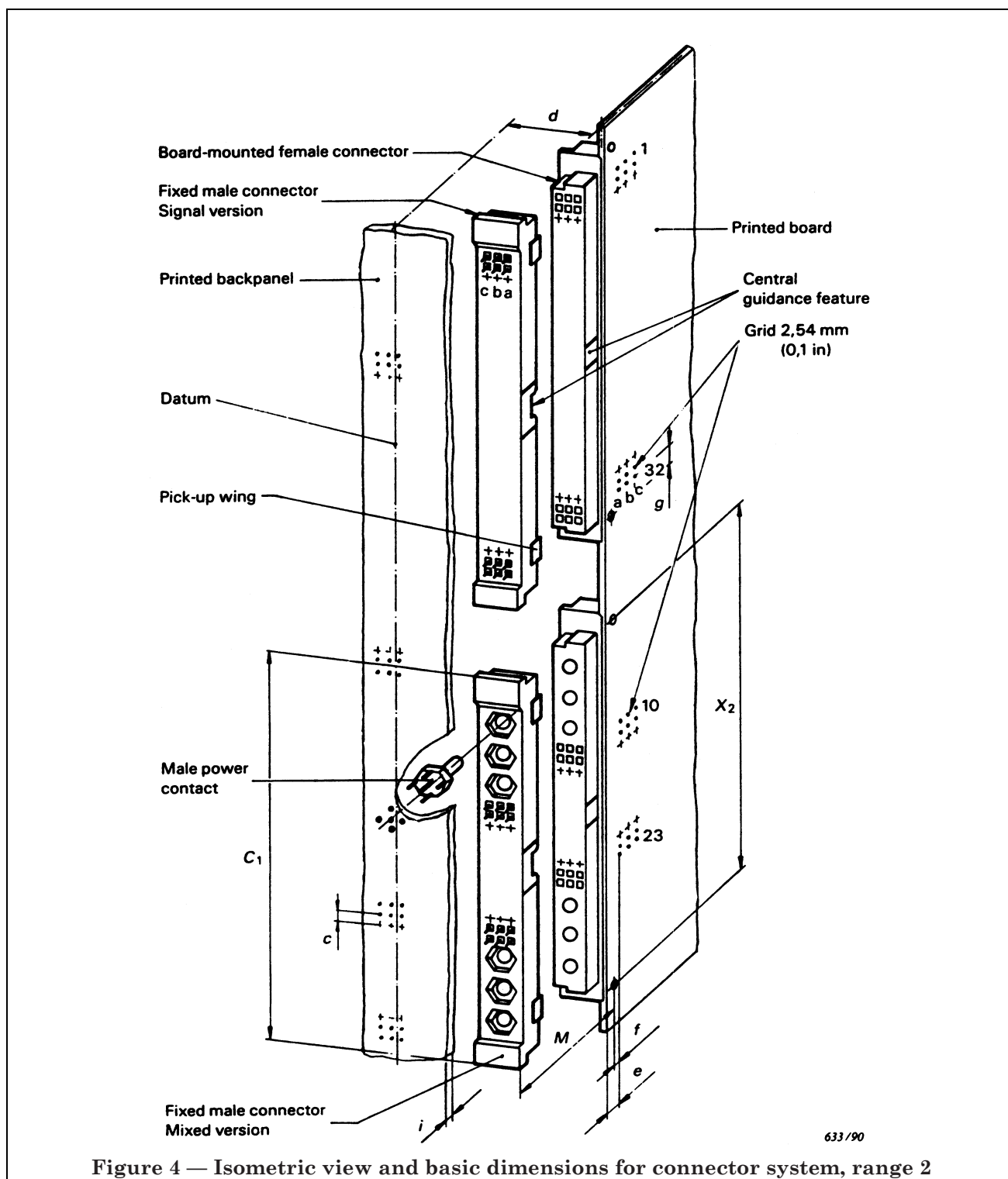


Figure 4 — Isometric view and basic dimensions for connector system, range 2

3.1.4 Isometric views and values (see Figure 3 and Figure 4, pages 10 and 11)

Table 1

Reference letter	Dimensions		Description
	mm	in	
C_1	94	3,701	Maximum overall length of the fixed connector
M	17,46 14,96	0,687 0,589	Range of 2,5 mm (0,098 in) in which reliable contact is ensured NOTE See Sub-clause 3.2 for mating information
X_1 ^a	—	—	—
X_2	88,90	3,500	Distance between the two mounting holes of the board-mounted connector NOTE The mounting holes are also located on the grid of 2,54 mm (0,100 in) according to IEC Publication 97
a ^a	—	—	—
b ^a	—	—	—
c	2,54	0,100	Grid dimension of the terminations of the fixed connector
d	5,08	0,200	Distance between datum line and centreline of a 1,6 mm printed board
e	5,08	0,200	Distance between the edge of the printed board and the first row of component holes for the board-mounted connector
f	2,54	0,100	Distance between the mounting holes and the first row of component holes for the board-mounted connector
g	5,08	0,200	Distance between a mounting hole and the component hole for the termination No. 1 or No. 32 of the board-mounted connector
h ^a	—	—	—
i	3,20	0,126	Thickness of backpanel for the fixed connector

^a No mechanical fixing holes — letter only for reference with other standardized connector families.

3.2 Mating information

3.2.1 Plug-in direction

The engagement depth of both male and female mouldings is such that the specified contact resistance is ensured within the range $M = 14,96$ mm to $17,46$ mm (0,589 in to 0,687 in), first-to-make/last-to-break contact facilities included (see Figure 5).

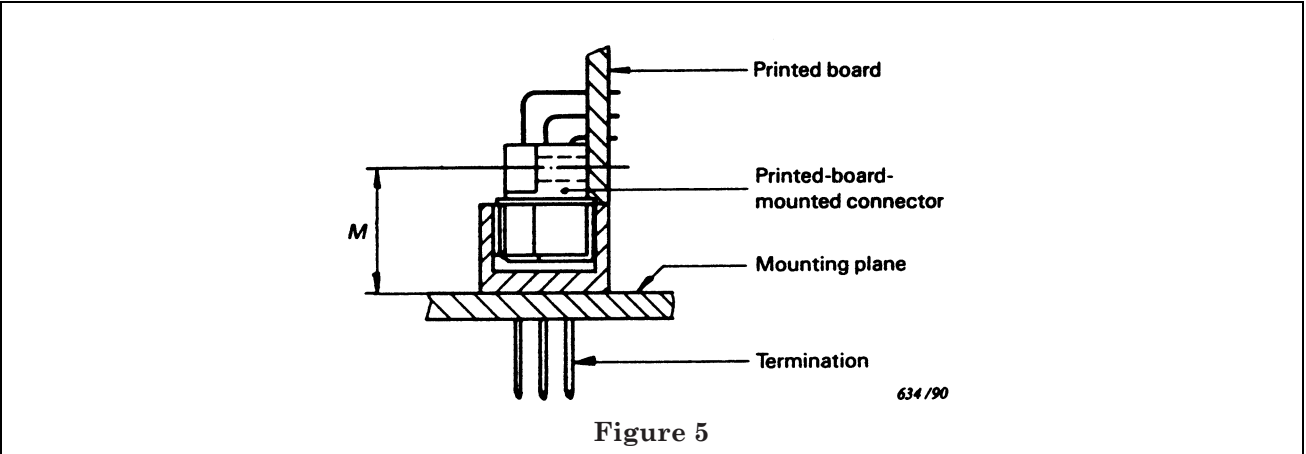
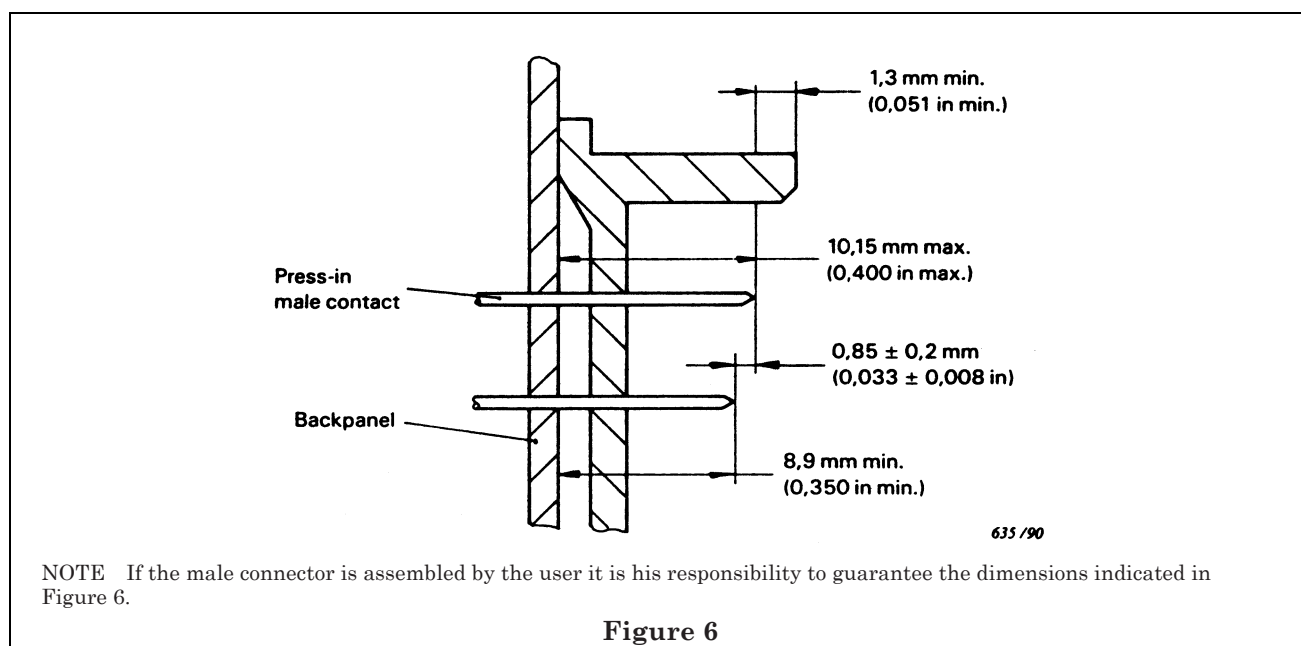


Figure 5

The design also ensures adequate protection of the tips of the first-to-make/last-to-break contacts. These contacts are provided solely by inserting the appropriate male signal contacts further through the backpanel as shown in Figure 6 such that the tips of these contacts are a nominal 0,85 mm (0,033 in) in advance of the tips of the remaining contacts.

NOTE To ensure the first-to-make/last-to-break contact function, it is recommended that the electrical signal of the first-to-make/last-to-break contacts be applied in parallel to protruding contacts at both ends of each equipped contact row.



3.2.2 Perpendicular to plug-in direction

The design of the board-mounted and the fixed connectors is such that a displacement of at least 2 mm (0,079 in) in the transverse direction of the connectors and 1 mm (0,039 in) in the longitudinal direction of the connectors can be accommodated, provided that the printed board has freedom to move (see Figure 7).

NOTE With two connector assemblies mounted rigidly in line on a backpanel and on a plug-in unit, a position tolerance of 0,1 mm (0,004 in) diameter on the termination holes of the boards will ensure the correct alignment and mating of the connectors without the need to use assembly jigs.

The central guidance is provided to reduce the total tolerance field in the case of in-line mounting such that, in practice, a proper entering of the contacts into the female cavity is ensured in the case of maximum board inclination and backpanel bow. The pick-up wings, extending the chamfer of the long walls of the male moulding, assist in the final alignment of female connectors fitted to bowed printed boards (see Figure 7).

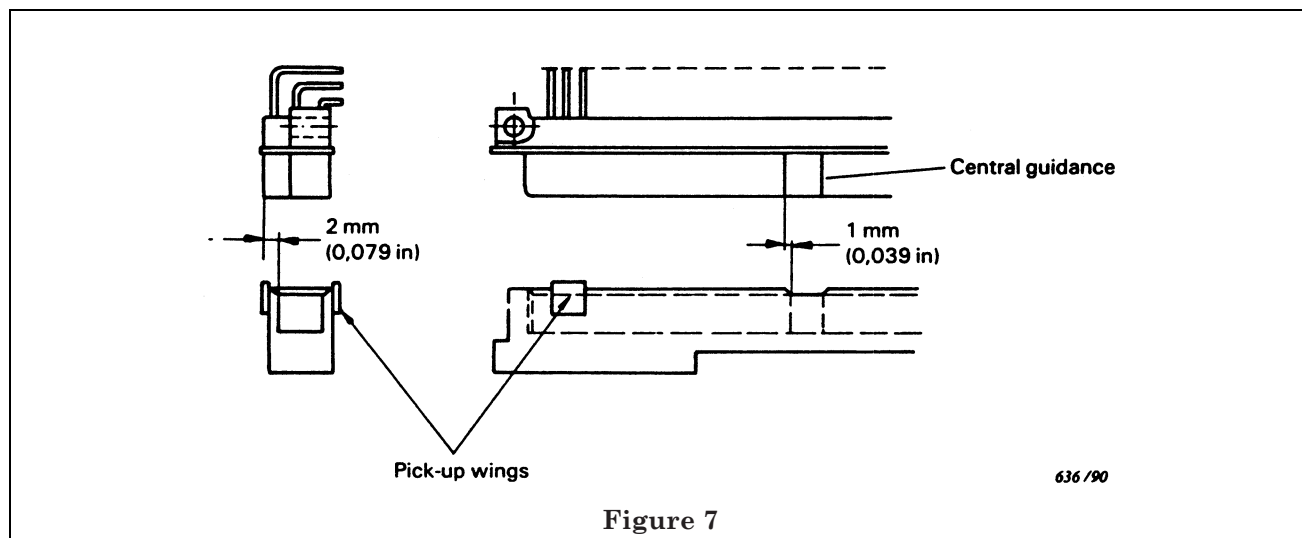


Figure 7

3.2.3 Inclination

The design of the board-mounted and fixed connectors is such as to allow for an initial angular misalignment of 4° in longitudinal axis and 2° in transverse axis, and still ensure the first-to-make/last-to-break mating when the contacts with this function are placed in each row in the 1st or 2nd position from both ends of each connector (see Figure 8).

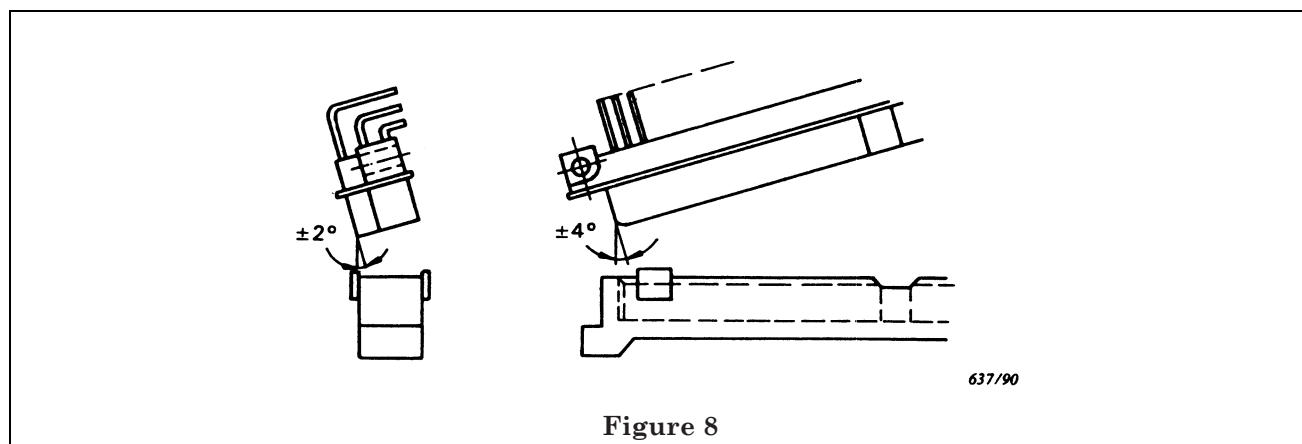


Figure 8

3.3 Survey of types

Table 2

Type and number of contacts	A032	A064	A096	M014	M028	M042	C004	C010	C020	C064
Smallest pitch of adjacent connectors $n \times 2,54$ mm ($n \times 0,100$ in)	5						4	4	4	6
Current carrying capacity at 70 °C (see Clause 6)	1,3 A			Signal contacts: 1,3 A			1,3 A			
				Power ^a Contacts: 30 A						
Minimum creepage and clearance ^b between contacts and chassis	1,8 mm (0,071 in)									
creepage										
clearance	1,6 mm (0,063 in)									
between adjacent contacts on 2,54 mm (0,100 in) grid	1,2 mm (0,047 in)						0,5 mm (0,020 in)			
creepage										
clearance	1,2 mm (0,047 in)						0,5 mm (0,020 in)			
between adjacent contacts on 5,08 mm (0,200 in) grid	3,0 mm (0,118 in)									
creepage										
clearance	3,0 mm (0,118 in)									
^a Maximum current rating per contact, depending also on the crimp connection. The current rating per connector at 70 °C is 65 A max.										
^b Application information: — Permissible operating voltages depend on the application and the applicable or specified safety requirements. — Reductions in creepage or clearance distances may occur due to the printed board or the wiring used and shall be duly taken into account.										

4 Dimensions

4.1 General

The dimensions in millimetres are original. The following drawings are shown in first angle projection. The shapes of the connectors may deviate from those given in the drawings below as long as the specified dimensions are not influenced. The basic dimensions contained in Clause 3 are mandatory but only repeated in subsequent clauses if necessary.

4.2 Fixed connector and header dimensions

4.2.1 Dimensions of male contacts (range 1)

4.2.1.1 Male signal contact for cable connectors and solderless wrapped connections, types 603-9 IEC-A001 ME-SX-X

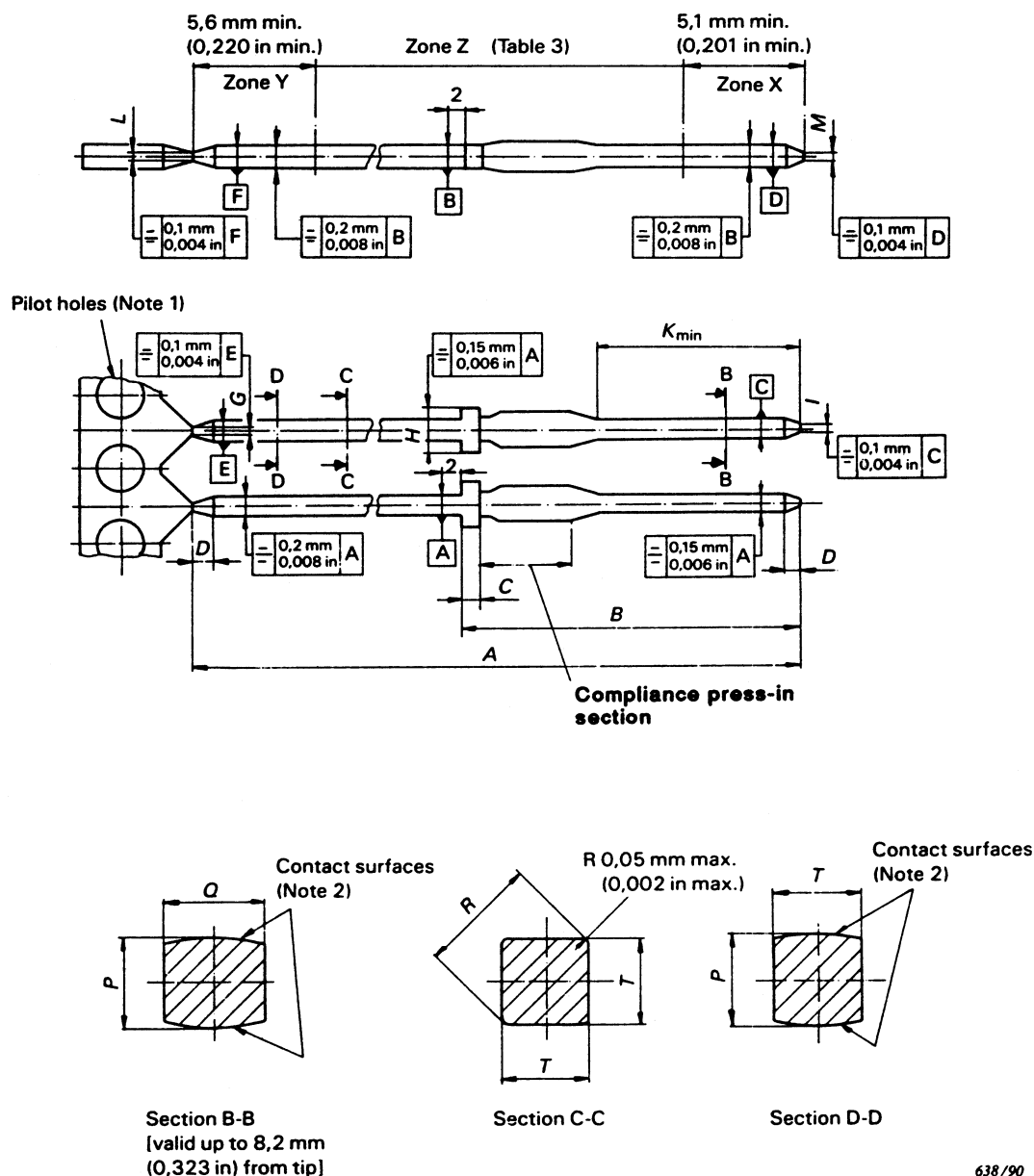


Figure 9

Table 3

Zone	X	Y	Z
Mates with	Board-mounted connector	Free cable connector	Backpanel and wire wrap connection

Table 4 — Values of dimensions shown in Figure 9, page 16

	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>		
mm	32,40 32,20	14,65 14,50	0,75 0,70	0,55 0,45		
in	1,276 1,268	0,577 0,571	0,0295 0,0276	0,022 0,081		

	<i>G</i>	<i>H</i>	<i>I</i>	<i>K</i>	<i>L</i>	<i>M</i>
mm	0,45 0,35	1,35 1,25	0,25 0,15	min. 8,2	0,3 0,2	0,25 0,10
in	0,018 0,014	0,053 0,049	0,010 0,006	min. 0,323	0,012 0,008	0,010 0,004

			<i>P</i>	<i>Q</i>	<i>R</i>	<i>T</i>
mm			0,61 0,56	0,70 0,65	0,86 0,76	0,69 0,59
in			0,024 0,022	0,028 0,026	0,034 0,030	0,027 0,023

4.2.1.2 Male single contact for solderless wrapped connections according to IEC Publication 352-1, types 603-9 IEC-A000 MF-SX-X

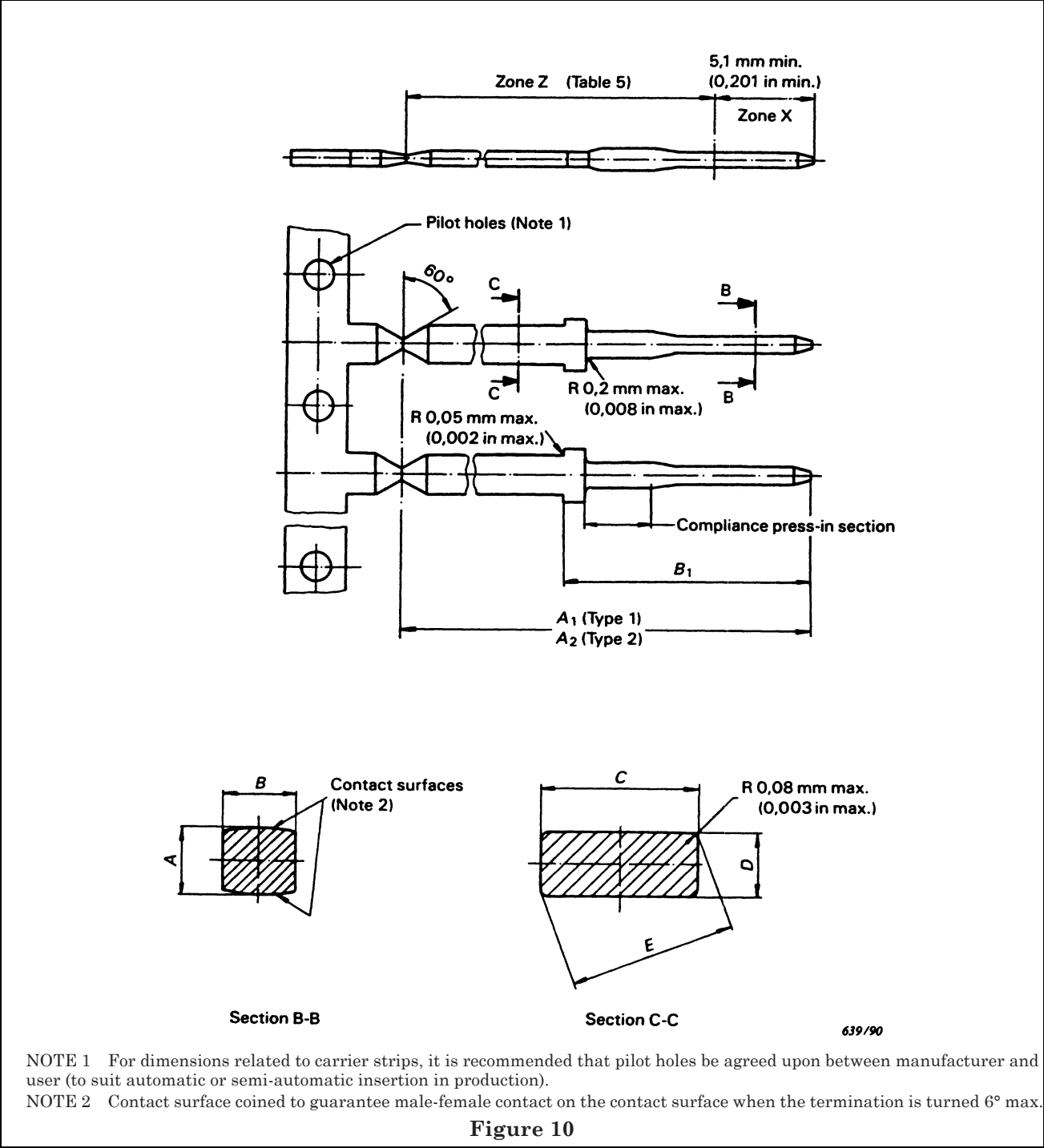


Table 5

Zone	X	Z
Mates with	Board-mounted connector	Backpanel and wire wrap connection

Table 6 — Values of dimensions shown in Figure 10, page 18

	A	A ₁	A ₂	B	B ₁	C	D	E
mm	0,66 0,56	24,1 23,9	29,1 28,9	0,70 0,65	15,35 15,20	1,6 1,4	0,68 0,58	1,65 1,50
in	0,026 0,022	0,949 0,941	1,146 1,138	0,028 0,026	0,604 0,598	0,063 0,055	0,027 0,023	0,065 0,059

(For other dimensions, see Figure 9, page 16, and Table 4.)

4.2.1.3 Male power contact (version with threaded fixing), types 603-9 IEC-M001 ML-SX-X

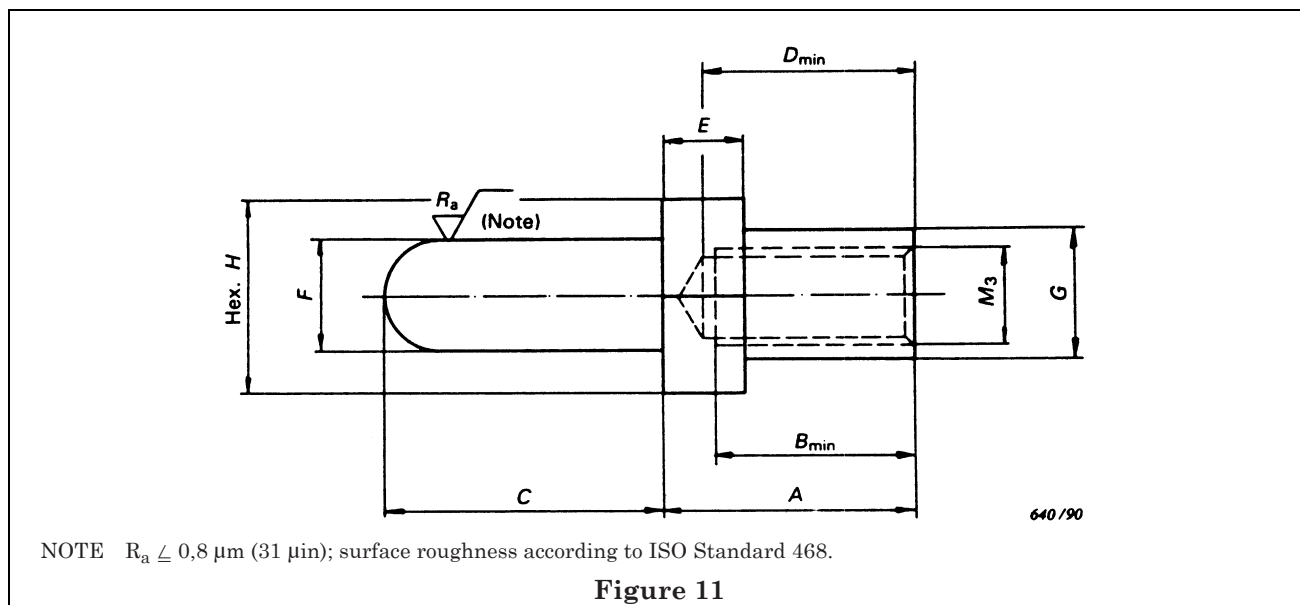


Table 7 — Values of dimensions shown in Figure 11

	A	B	C	D	E	ØF	ØG	H
mm	7,6 7,4	min. 5	8,6 8,4	min. 6	2,6 max.	3,62 3,55	4,0 3,8	6,1 5,9
in	0,299 0,291	min. 0,197	0,339 0,331	min. 0,263	0,102 max.	0,143 0,140	0,157 0,150	0,240 0,232