UDC 621·3·049·7 - 772·4 : 006·78

Indian Standard

(Reaffirmed 1998)

DIMENSIONS OF MECHANICAL STRUCTURES OF THE 482·6 mm SERIES

PART 2 SUBRACKS AND ASSOCIATED PLUG-IN UNITS

Section 2 Plug-in Units

1. Scope — Covers the basic dimensions of plug-in units and printed boards.

1.1 The drawings given in this standard are not intended to indicate details of design.

2. Plug-in Unit Description — A plug-in unit can be of various types as shown in Fig. 1 and 2 and Fig. 1 of Section 1 of this standard (Part 2). It usually consists of a printed board assembly with or without connector(s), handle(s), ejector(s), front panel, rear panel, mounting rails and covers. A plug-in unit can itself house a plurality of different types of plug-in units.

3. Plug-in Unit and Printed Board Basic Dimensions — Plug-in unit and printed board basic dimensions are given in Fig. 1 and 2. The following notes and Table 1 are to be read with Fig. 1 and 2.

Note 1 — For a nominal 5·08 mm width filler panel, the 7·62 mm dimension is reduced to 2·54 mm.

Note 2 — D_{t1} and D_{t2} are the inspection dimensions to ensure reliable connector mating (*see* 4 and Appendix A).

Note 3 — For connector details *see* 4 and Appendix A.

Note 4 — Maximum dimensions for optical location feature for front panel alignment and/or screw retention. The standard 2·5 mm screw fixing does not exclude other means of fixing, if agreed between manufacturer and customer.

Note 5 — The position of the centre line of the first printed board will depend on the connector chosen. The preferred dimension of A is 3·27 mm unless found to be impracticable.

Note 6 — Nominal dimension only.

Note 7 — The overall printed board depth is the D_b dimension noted in Table 1 plus the length of the edge board contact tongue.

Note 8 — The thickness of printed boards for plug-in units shall be $1·6 \pm 0·2$ mm according to IS : 5921 (Part 1)-1970 'Specification for metal-clad base material for printed circuits for use in electronic and telecommunication equipment'.

Note 9 — H_b range 1 is the preferred board height for plug-in units.

Note 10 — If necessary manufacturers can increase the depths in increments of 60 mm.

Note 11 — The symbol U means a vertical increment of 44·45 mm. Tolerances are non-cumulative.

Note 12 — Dimensions Hc and Hd are height of box or dimensions over the guide rails.

4. Mechanical Interchangeability of Plug-in Units

4.1 Figure 3 illustrates the basic parameters which need to be controlled to ensure the correct mating of connectors and the interchangeability of plug-in units equipped with a particular type of connector.

Subrack

D_c — Inspection dimension for the distance between the front attachment plane and the fixed connector fixing plane.

A — Distance between the first pitchline and the centreline of the first printed board position or the first side plate of the box type plug-in unit.

C — Vertical distance between the fixing holes for the fixed connector.

E — Subrack height, according to IS : 9606-1980 'Dimensions of panels and racks (482·6 mm systems)' (dimension E for reference only).

L — Aperture height.

Z — Dimension from the centreline of the printed board position to the centreline of the fixing hole for the fixed connector in the subrack.

Z_1 — Dimension between the centreline of the printed board position and the centreline of a defined termination row on the fixed connector. The dimension determines the location of the wiring grid on the subrack.

Adopted 13 June 1986

Gr 6

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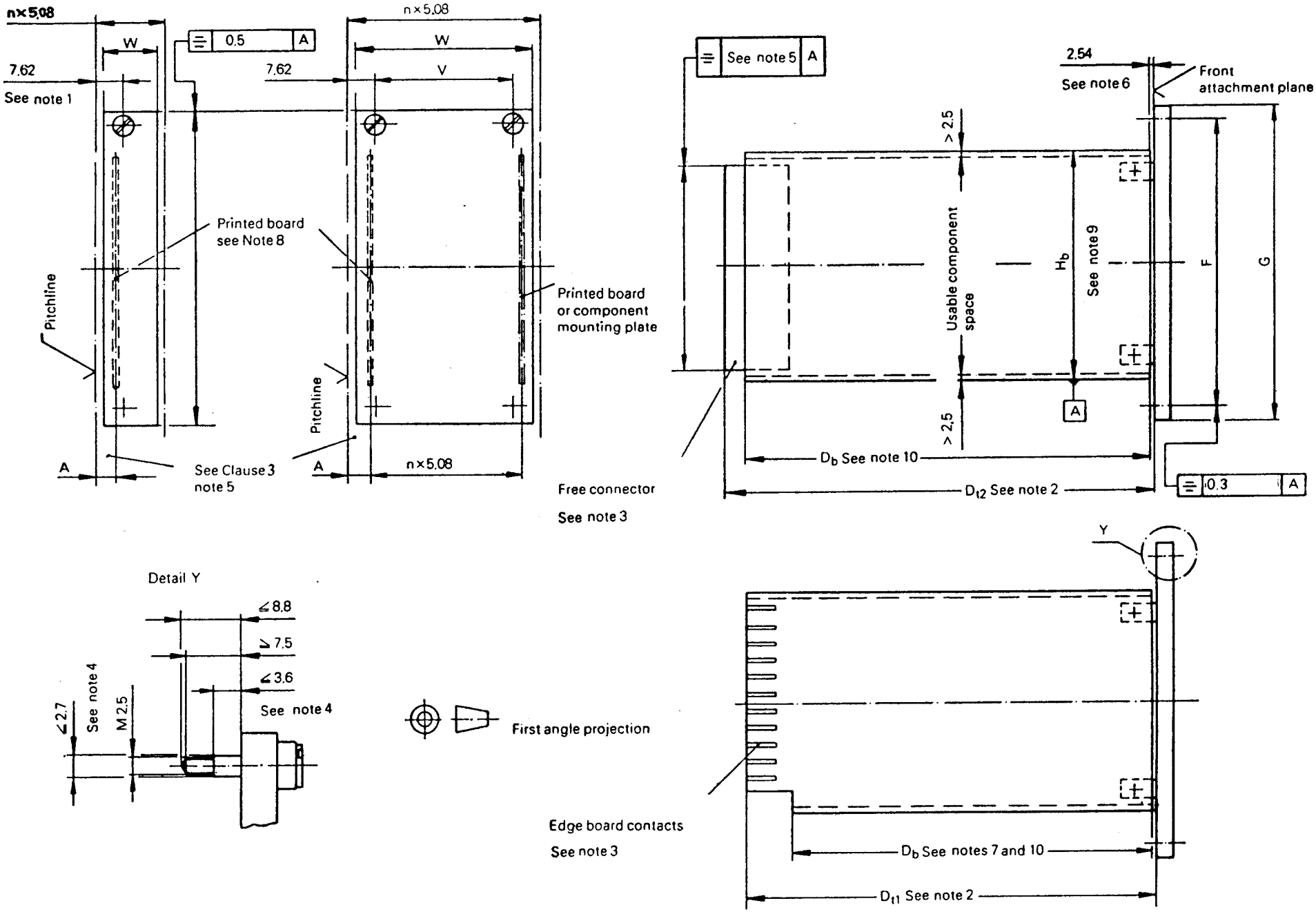
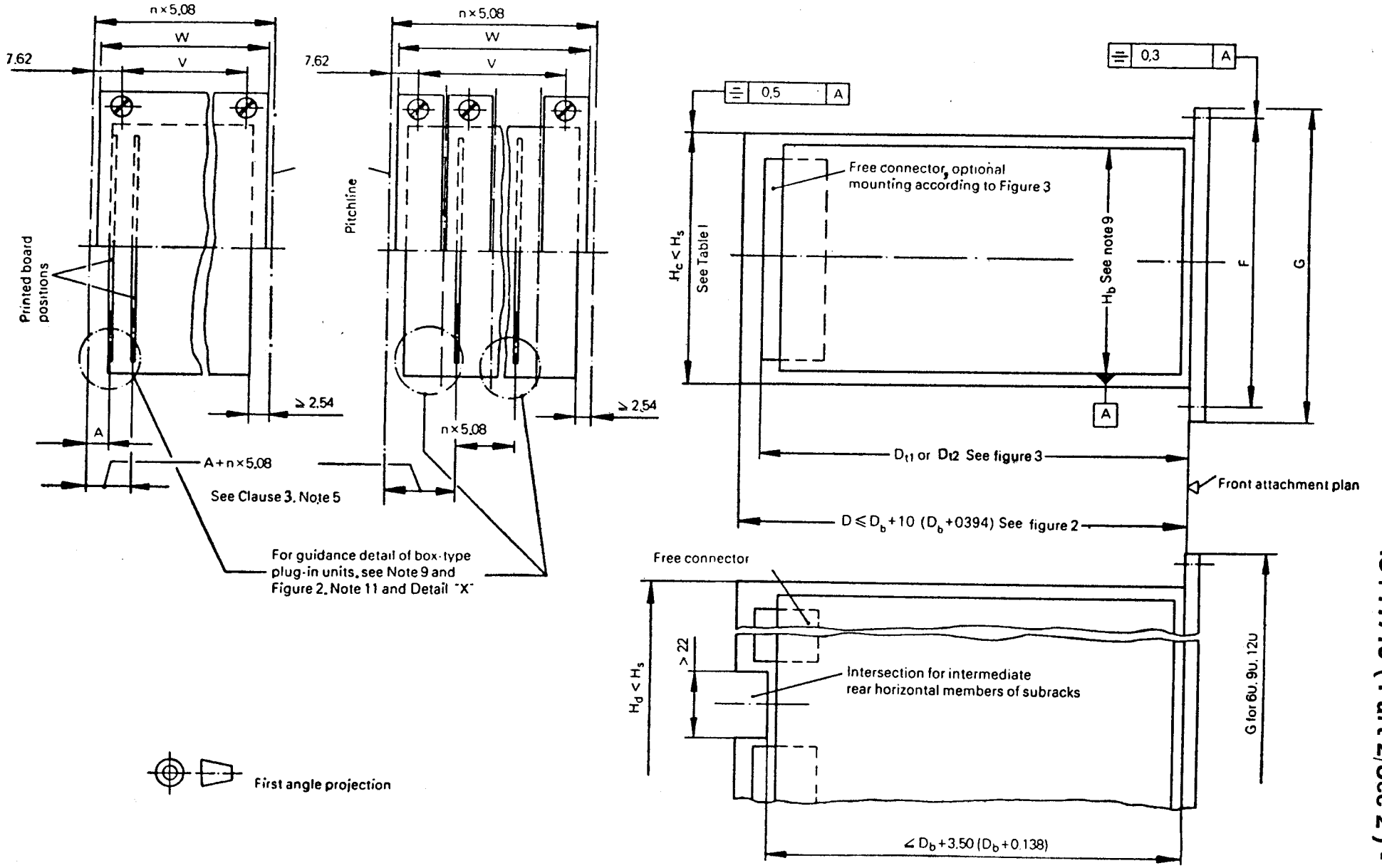


All dimensions in millimetres.

FIG. 1 BASIC DIMENSIONS OF PRINTED BOARD TYPE PLUG-IN UNIT



All dimensions in millimetres.

FIG. 2 BASIC DIMENSIONS OF BOX PLUG-INUNIT

TABLE 1 PLUG-IN UNIT AND PRINTED BOARD DIMENSIONS

(*Clause* 3)

All dimensions millimetres.

$n \times U$ (*see* Note 11)		2*U*	3*U*	4*U*	5*U*	6*U*	7*U*	8*U*	9*U*	10*U*	11*U*	12*U*
$Hb\ ^{+0.00}_{-0.30}$ (*see* Note 9)	1	55·55	100·00	144·45	188·90	233·35	277·80	322·25	366·70	411·15	455·60	500·05
	2	67·31	111·76	156·20	200·70	245·10	289·55	334·00	378·45	422·90	467·35	511·80
$G\ ^{+0.00}_{-0.30}$		84·25	128·70	173·15	217·60	262·05	306·50	350·95	395·40	439·85	484·30	528·75
$F \pm 0.20$		78·05	122·50	166·95	211·40	255·85	300·30	344·75	389·20	433·65	478·10	522·55
$D_b\ ^{+0.00}_{-0.30}$ (*see* Notes 7 and 10)	1	100·00										
	2	160·00										
	3	220·00										
	4	280·00										
W		$< n \times 5{\cdot}08$										
V		$n \times 5{\cdot}08$										

Plug-in Unit

D_{t1} — Inspection dimension for the distance between the front attachment plane and the rear edge of a printed board with edge-board contacts.

D_{t2} — Inspection dimension for the distance between the front attachment plane and a rear face of the free connector to be defined in the relevant subsequent connector appendix.

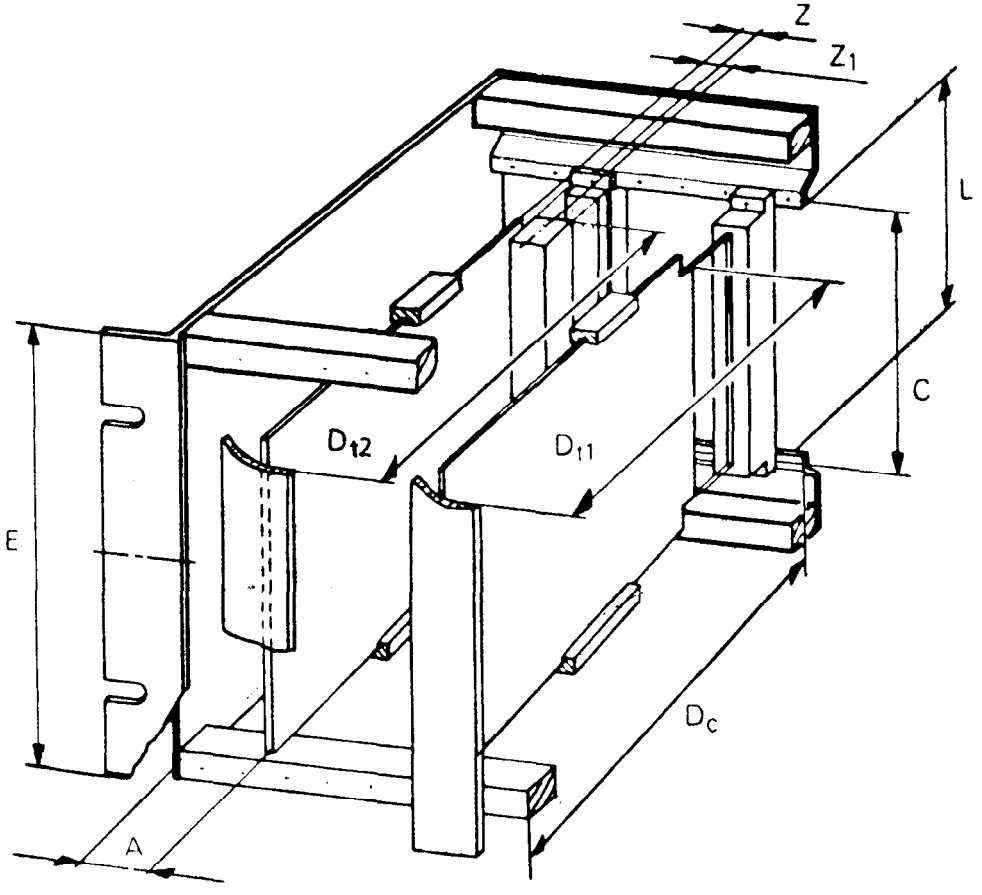


FIG. 3 BASIC PARAMETERS

The precise value of the parameters for each type of connector will be in the appropriated supplement sheet and are derived from the dimensions given in this standard and from the relevant Indian Standards for the chosen connector.

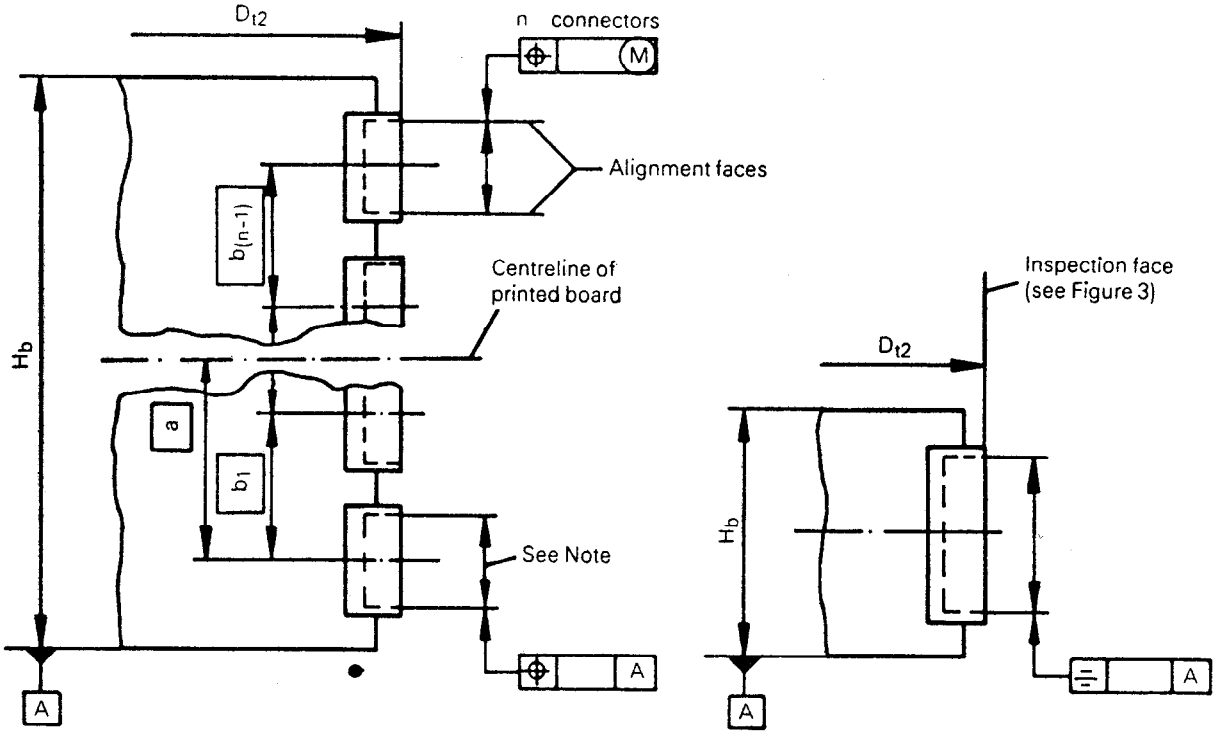
4.2 *Positions of Connectors on Plug-in Units* — In the relevant supplement sheet the mounting position of each free connector shall be specified by theoretically exact dimensions between the bottom edge of the printed board and the centre line of the connector.

In addition a position or a symmetry tolerance shall be given to the alignment faces of the connector relative to the top and bottom edges of the printed board. If more than one connector is mounted on a printed board, the admissible tolerance between the alignment faces shall be noted using preferably the maximum material condition.

Figures 4 and 5 show examples only of methods of establishing tolerances of connectors mounted on printed boards. The exact method of establishing tolerances for any given connector shall be specified in the relevant connector supplement sheet.

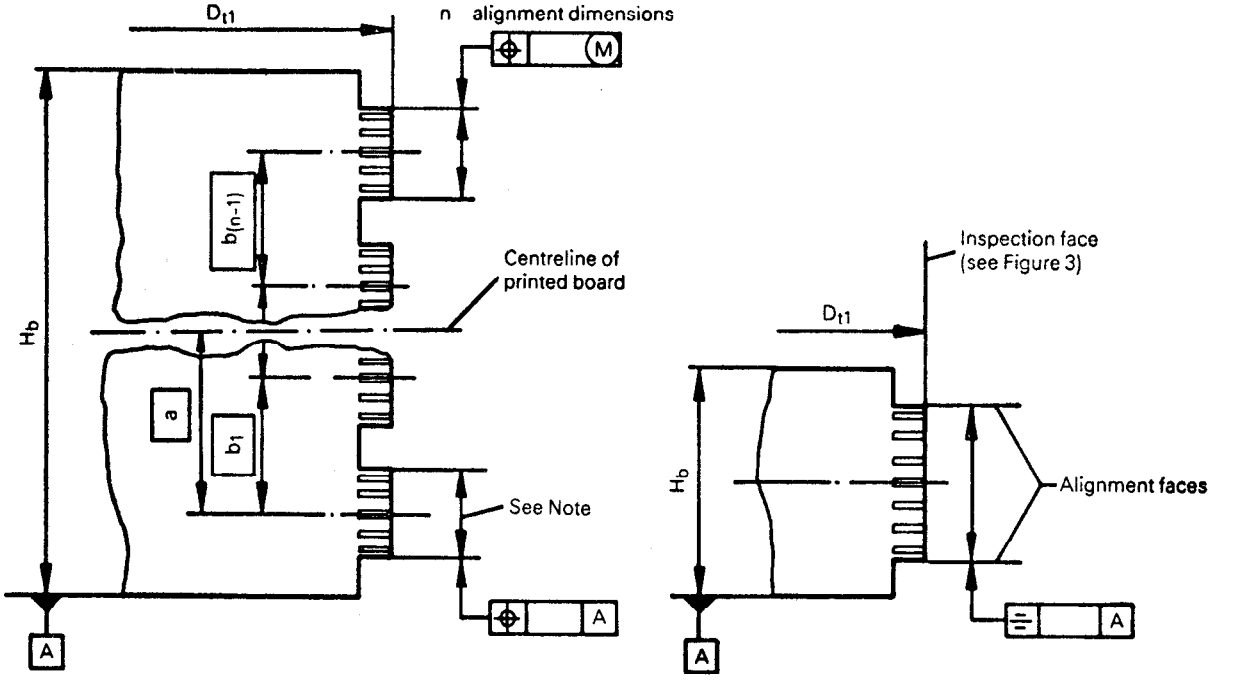
4.3 *Position of Fixed Connectors on Subracks* — Manufacturers of subracks shall define the fastening dimensions for the fixed connectors so that their positions correspond to the standard board connector positions noted in the relevant supplement sheet, so that the plugging of plug-in units is possible without adjustment of the individual fixed connector. The positions tolerances for the fixed connectors can be derived from the tolerance requirements according to **4.1** and Fig. 4 or 5.

Note — Appendix A may be used as a guide for the preparation of subsequent appendices.



Note — The appropriate dimension or the reference letter of the connector standard should be noted. In case the alignment dimension varies with the connector types, the relevant number of contacts should be added.

FIG. 4 FREE-CONNECTOR POSITIONS



Note — The appropriate dimension or the reference letter of the connector standard should be noted. In case the alignment dimension varies with the connector types, the relevant number of contacts should be added.

FIG. 5 EDGE BOARD CONTACT POSITIONS

APPENDIX A

(*Clauses* 3 *and* 4.3)

MOUNTING OF CONNECTORS

A-1. Basic Parameters of Subracks

A-1.1 *Inspection Dimensions* D_c — The specified value for the inspection dimensions D_c on subracks, together with the inspection dimensions D_{t2} on plug-in units (*see* **A-2.2**), guarantee reliable connector mating and are mandatory for the mechanical interchangeability of plug-in units in the plugging direction.

In Table 2 the D_c dimensions are listed dependent on the preferred printed board depths D^b. The values are applicable for all subrack heights E.

TABLE 2 INSPECTION DIMENSIONS D_c

All dimensions in millimetres.

D_b nominal	D^c $^{+0.86}_{-0.14}$
100	115·24
160	175·24
220	235·24
280	295·24

A-1.2 *Printed Board Position, Dimension A*

$A = 3{\cdot}27$ mm

A-1.3 *Vertical Fixing Hole Distance C*

$C = 90{\cdot}0$ mm

All fixed connector types have the same fixing holes.

A-1.4 *Aperture Height L*

$L = Min\ 85{\cdot}0$ mm

A-1.5 *Dimension Z*

$Z = 4{\cdot}35$ mm

The distance between the centre line of the printed board position and the centre line of the fixed connector fixing holes results from the connector dimension $d = 3{\cdot}55$ mm plus half the thickness of the printed board.

A-2. Basic Parameters of Plug-in Units

A-2.1 *Inspection Dimensions* D_{t1} — Not applicable. The fixed connector types cannot be mated with edge-board contacts.

A-2.2 *Inspection Dimensions* D_{t2} — The inspection dimensions D_{t2} for the plug-in unit depths depend on the printed board depths D^c and are related to the connector dimensions for connectors of types *B, C, D, F* and *G*.

The appropriate inspection faces are shown in Fig. 6. The values noted in Table 3 are valid for all plug-in unit heights.

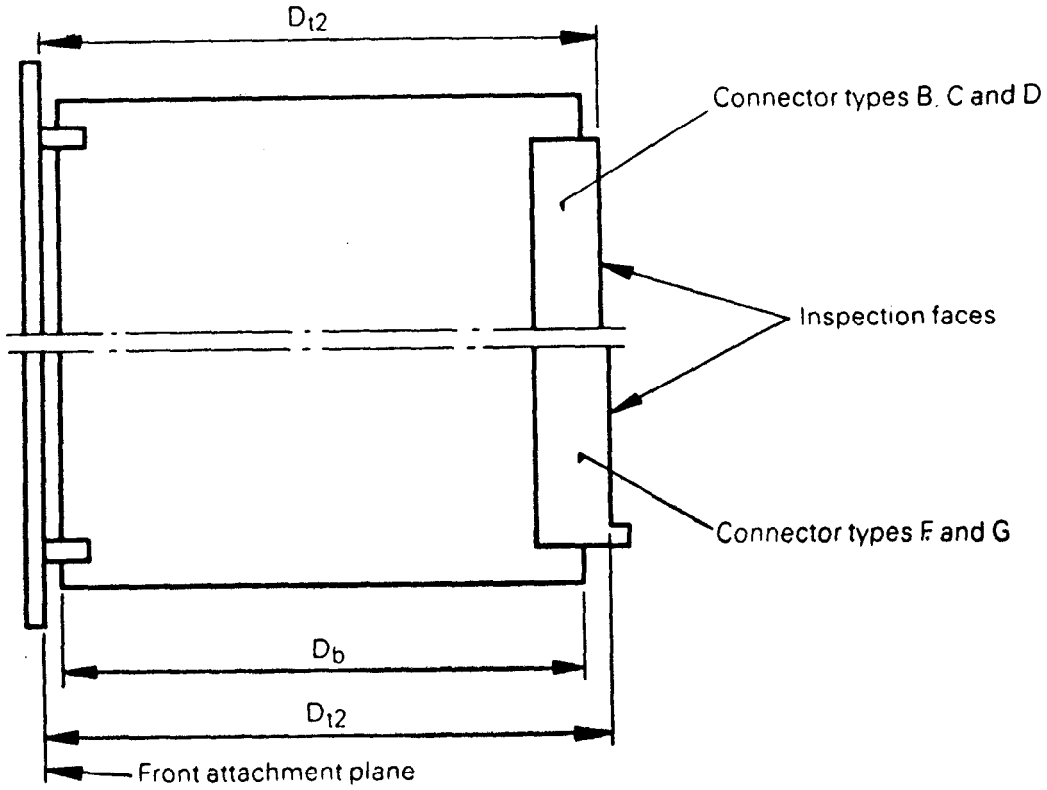


FIG. 6 INSPECTION DIMENSIONS D_{t2}

TABLE 3 INSPECTION DIMENSIONS D_{t2}

(Clause A-2.2)

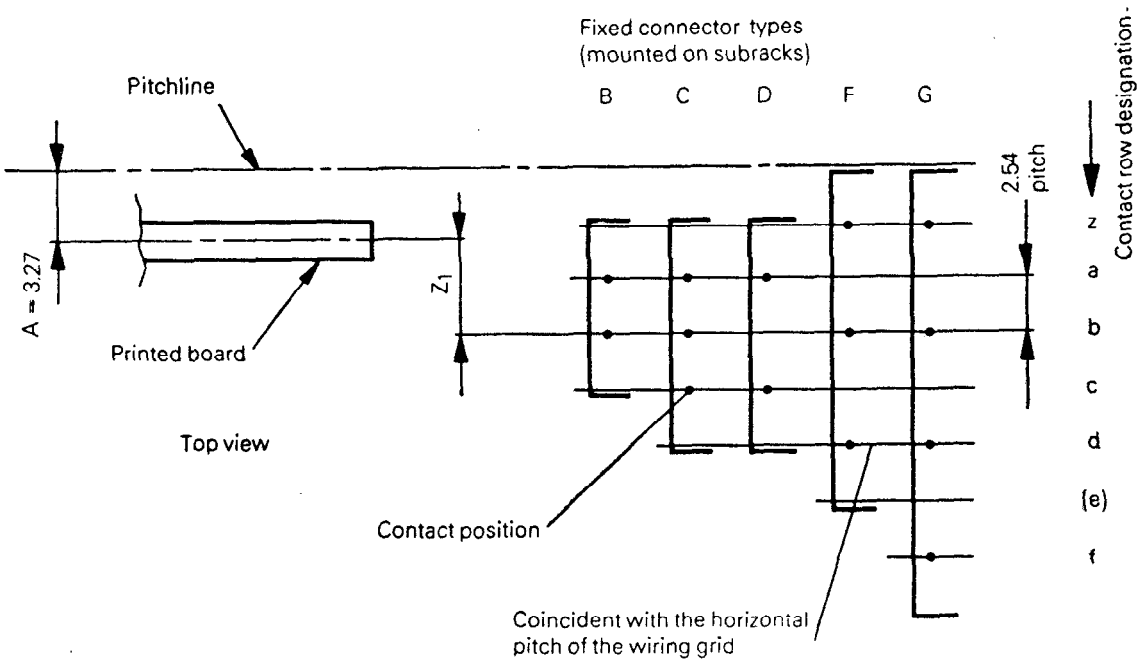
All dimensions in millimetres.

Connector Type	$D_{t2} \pm 0{\cdot}4$			
	Printed board depth D_b (nominal)			
	100	160	220	280
B				
C	109·93	169·93	229·93	289·93
D				
F	111·93	171·93	231·93	291·93
G				

A-2.3 *Dimension* Z_1 — As outlined in Fig. 7, the dimension Z_1 is the distance between the centreline of the printed board and the centreline of the contact terminations of row *b*. The dimension gives the location of the wiring grid relative to the printed board position in the horizontal direction.

$Z_1 = 4{\cdot}65$ mm

The dimension Z_1 results from dimensions *b* and *d* plus half the printed board thickness.



All dimensions in millimetres.

FIG. 7 DIMENSION Z_1

A -3. Positions of Connectors on Plug-in Units

Figures 8 and 9, with the theoretical exact dimensions in Table 4 define the standard positions of the free connector types relative to the printed board heights H_b. Notes 1, 2 and 3 are to be read with Fig. 8 and 9.

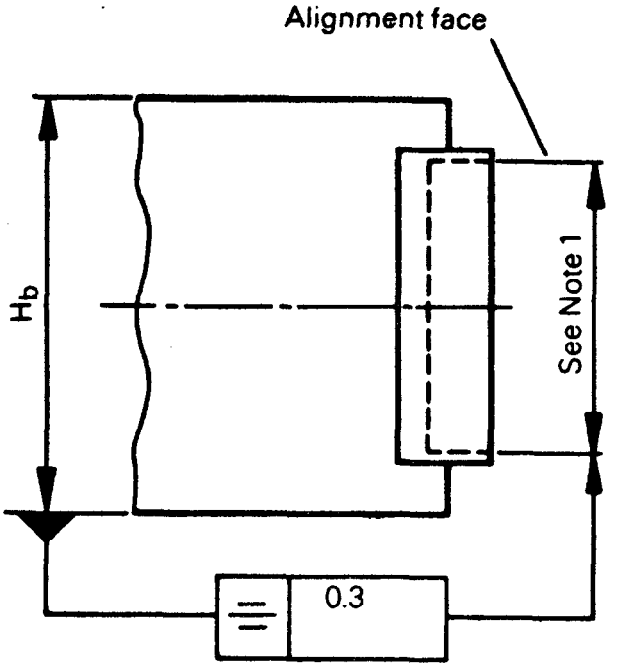
Note 1 — $l_2 = 85{\cdot}2^{+0{\cdot}2}_{-0}$ mm for types *B*, *C* and *D*

$l_2 = 85{\cdot}4^{+0{\cdot}2}_{-0}$ mm for types *F* and *G*

Note 2 — Position tolerances for types *B*, *C* and *D* : 0·05 mm
for types *F* and *G* : 0·15 mm

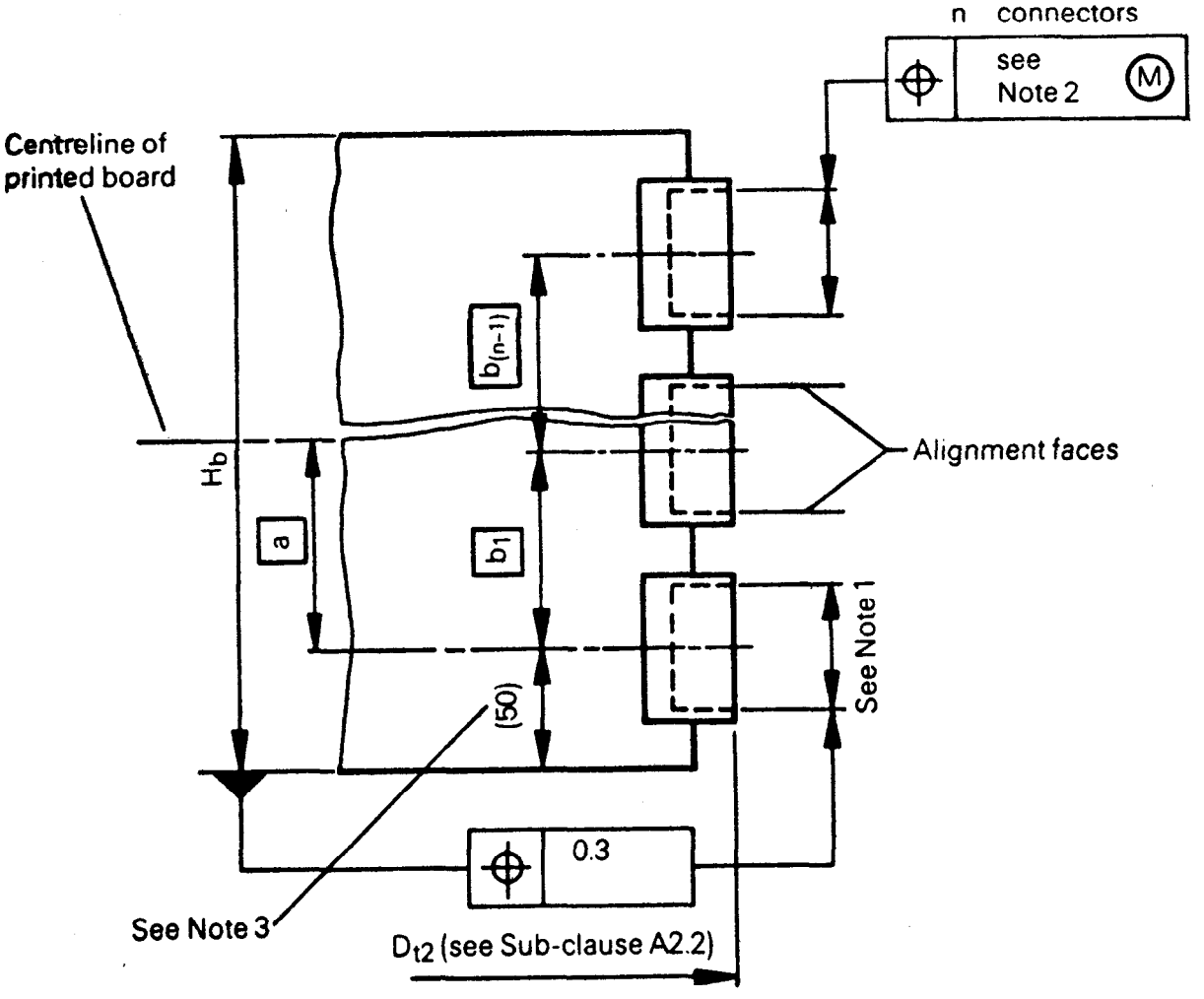
The position tolerances refer to the minimum clearance of 0·2 mm for types *B*, *C* and *D* and of 0·5 mm for types *F* and *G* between the free and fixed connectors.

Note 3 — 50 mm is the nominal reference dimension for the position of the first connector on printed board heights, H_b range 1. For printed board heights H_b range 2, the dimension is 55·88 mm.



All dimensions in millimetres.

FIG. 8 POSITION OF CONNECTORS ON PLUG-IN UNITS OF 3*U* SUBRACKS



All dimensions in millimetres.

FIG. 9 POSITION OF CONNECTORS ON PLUG-IN UNITS OF SUBRACKS GREATER THAN 3*U*

TABLE 4 POSITIONS OF CONNECTORS ON PLUG-IN UNITS

(*Clause* A-3)

All dimensions in millimetres.

Vertical Increments (*see* Note 1)	H_b Range 1 Nominal (*see* Note 2)	Connector Positions, Nominal Dimensions			
		a	b_1	b_2	b_3
2*U*	55·55	—	—	—	—
3*U*	100·0	0	—	—	—
4*U*	144·45	22·22	—	—	—
5*U*	188·9	44·45	—	—	—
6*U*	233·35	66·67	—	—	—
7*U*	277·8	88·9		—	—
8*U*	322·25	111·12	133·35	—	—
9*U*	366·7	133·35			—
10*U*	411·15	155·57		133·35	—
11*U*	455·6	177·8	*see* Note 3		—
12*U*	500·05	200·02			133·35

Note 1 — For definitions *see* IS : 9606-1980.

Note 2 — For the printed board heights H_b range 2, the nominal dimensions are 11·76 mm greater in each case, but the connector position dimensions remain as shown.

Note 3 — The dimensions noted are mandatory for vertical increments of 3*U*, 6*U*, 9*U* and 12*U*. Any deviation in connector positions should be agreed with the subrack supplier.

EXPLANATORY NOTE

This standard (Part 2) is based, without any technical change, on IEC Pub 297-3 (1984) 'Dimensions of mechanical structures of the 482·6 mm (19 in) series : Part 3 Subracks and associated plug-in units' issued by International Electrotechnical Commission.

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