CONNECTORS AND SAVERS, ELECTRICAL, RECTANGULAR, NON-REMOVABLE PCB CONTACTS

BASED ON TYPE MHD

ESCC Detail Specification No. 3401/065

Issue 3	February 2013

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DOCUMENTATION CHANGE NOTICE

(Refer to https://escies.org for ESCC DCR content)

DCR No.	CHANGE DESCRIPTION
750	Specification updated to incorporate editorial changes per DCR.

TABLE OF CONTENTS

1 GENERAL

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics, test and inspection data for Connectors and Savers, Electrical, Rectangular, with Non-Removable PCB Contacts, Based on Type MHD. It shall be read in conjunction with:

- ESCC Generic Specification No. 3401, Connectors, Electrical, Non-Filtered, Circular and Rectangular,

the requirements of which are supplemented herein.

1.2 RANGE OF COMPONENTS

The different configurations of the connectors specified herein and guiding and locking devices, which are also covered by this specification, are given in Table 1(a).

1.3 MAXIMUM RATINGS

The maximum ratings applicable to the connectors specified herein, which shall not be exceeded at any time during use or storage, are scheduled in Table 1(b).

1.4 PARAMETER DERATING INFORMATION

The applicable derating information for the connectors specified herein is shown in Figure 1.

1.5 PHYSICAL DIMENSIONS

The physical dimensions of the connectors, plugs and receptacles, guiding and locking devices specified herein, and the contact mounting configurations, are shown in Figures 2(a), 2(b) and 2(c).

2 APPLICABLE DOCUMENTS

The following documents form part of this specification and shall be read in conjunction with it:

(a) ESCC Generic Specification No. 3401, Connectors, Electrical, Non-Filtered, Circular and Rectangular.

3 TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESCC Basic Specification No. 21300 shall apply.

TABLE 1(a) – RANGE OF COMPONENTS

NUMBER OF CONTACTS

No. of Contacts (Note 1)	Max. Weight (2) (g)		Max. Engagement Force (N Max.)	Separation Force (N)	
	Plug	Receptacle		N Min.	N Max.
52	10.7	7.2	36.4	2.6	36.4
100	16.4	13.1	70	5	70
152	25.7	20.1	106.4	7.6	106.4
200	32.5	25.9	140	10	140
252	44.1	33	176.4	12.6	176.4
300	48.5	38.8	210	15	210
352	57.2	43.2	246.4	17.6	246.4
400	64.5	49.2	280	20	280

NOTES:
1. See Figure 2(a).
2. Weights with contacts and without accessories.

CONTACT TYPES

Contact Codes	Contact Types
10	Through board solder – 90° for PCB thickness: 1.44 - 1.76 mm
11	Through board solder – 90° for PCB thickness: 1.98 - 2.42 mm
12	Through board solder – 90° for PCB thickness: 2.88 - 3.52 mm
30	Through board solder – straight for PCB thickness: 2.16 - 2.64 mm
31	Through board solder – straight for PCB thickness: 2.88 - 3.52 mm
43	Surface mount for PCB thickness: 2.16 - 2.64 mm (Centred PCB)
45	Surface mount for PCB thickness: 1.44 - 2.4 mm (Off-centre PCB)
47	Surface mount for PCB thickness: 2.16 - 2.64 mm (Off-centre PCB)
91	Contact for connector saver male - female

NOTES:
1. See Figure 2(c).

GUIDING AND LOCKING DEVICES

Guiding and Locking Devices Code	Mounting On	Max. Weight (g)
110	Plug	0.55
111	Plug	1.35
121	Receptacle	0.65
124	Receptacle	1.5
134	Receptacle	1.3
201	Saver Receptacle	-

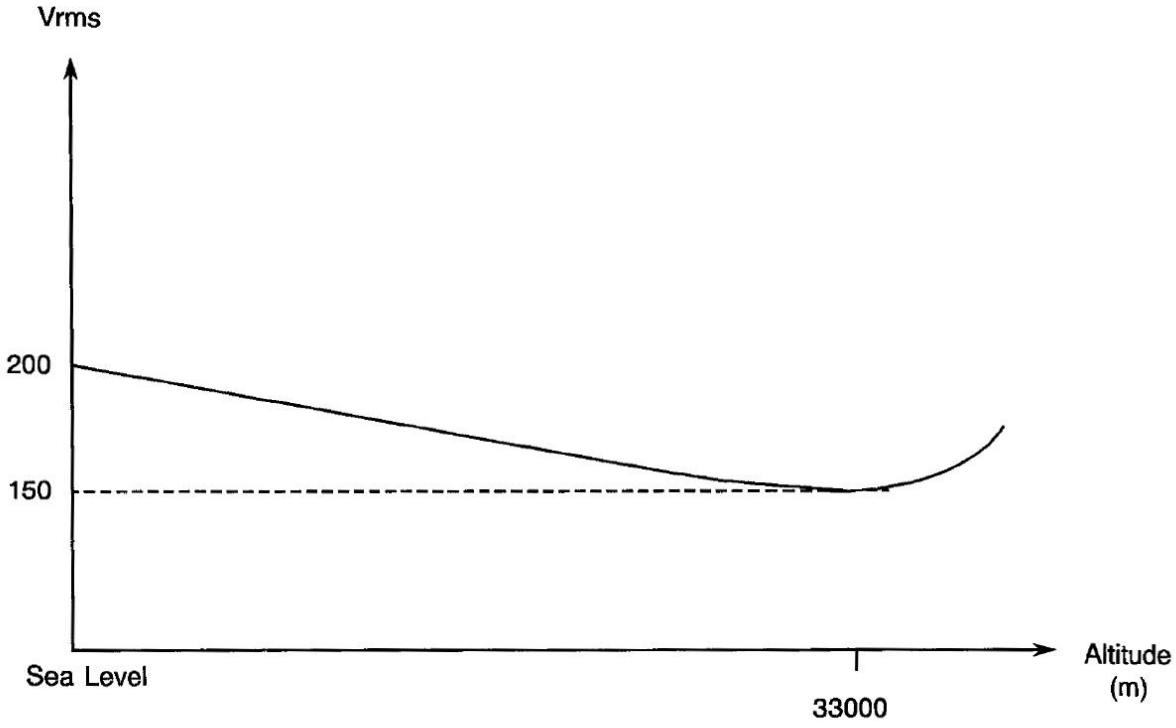
NOTES:
1. See Figure 2(c).

TABLE 1(b) – MAXIMUM RATINGS

No.	Characteristic	Symbol	Maximum Rating	Unit	Remarks
1	Working Voltage Sea Level	V	200	Vrms	Note 1
2	Rated Current	I_R	2	A	
3	Operating Temperature Range	T_{op}	-55 to +125	°C	T_{amb}
4	Storage Temperature Range	T_{stg}	-55 to +125	°C	
5	Soldering Temperature	T_{sol}	+260	°C	Note 2

NOTES:
1. Between contacts and shell.
2. Duration 10 seconds minimum and the same contact shall not be resoldered until 3 minutes have elapsed.

FIGURE 1 – PARAMETER DERATING INFORMATION

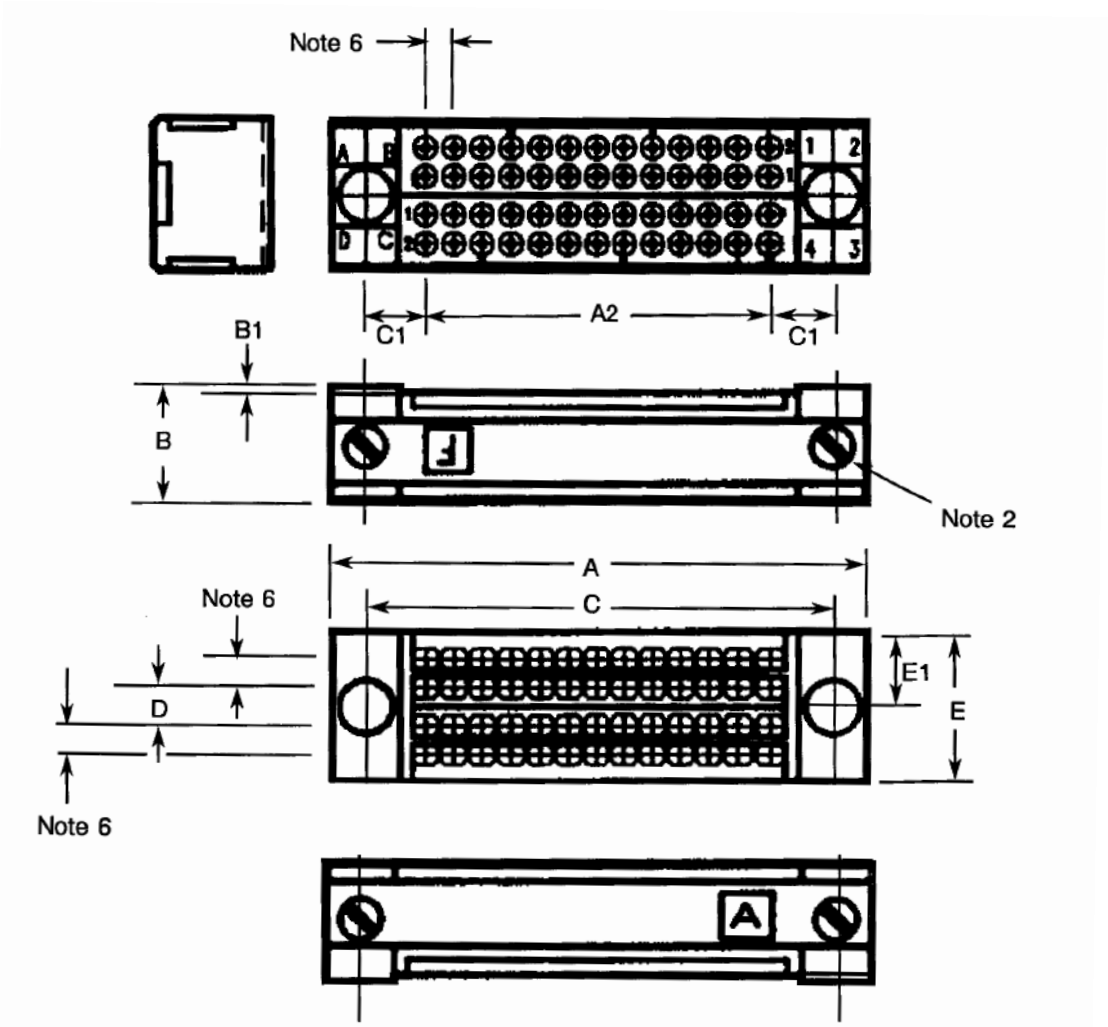


Working Voltage versus Altitude

FIGURE 2 – PHYSICAL DIMENSIONS

FIGURE 2(a) – INSERTS: PLUGS AND RECEPTACLES

RECEPTACLE, 52 CONTACTS

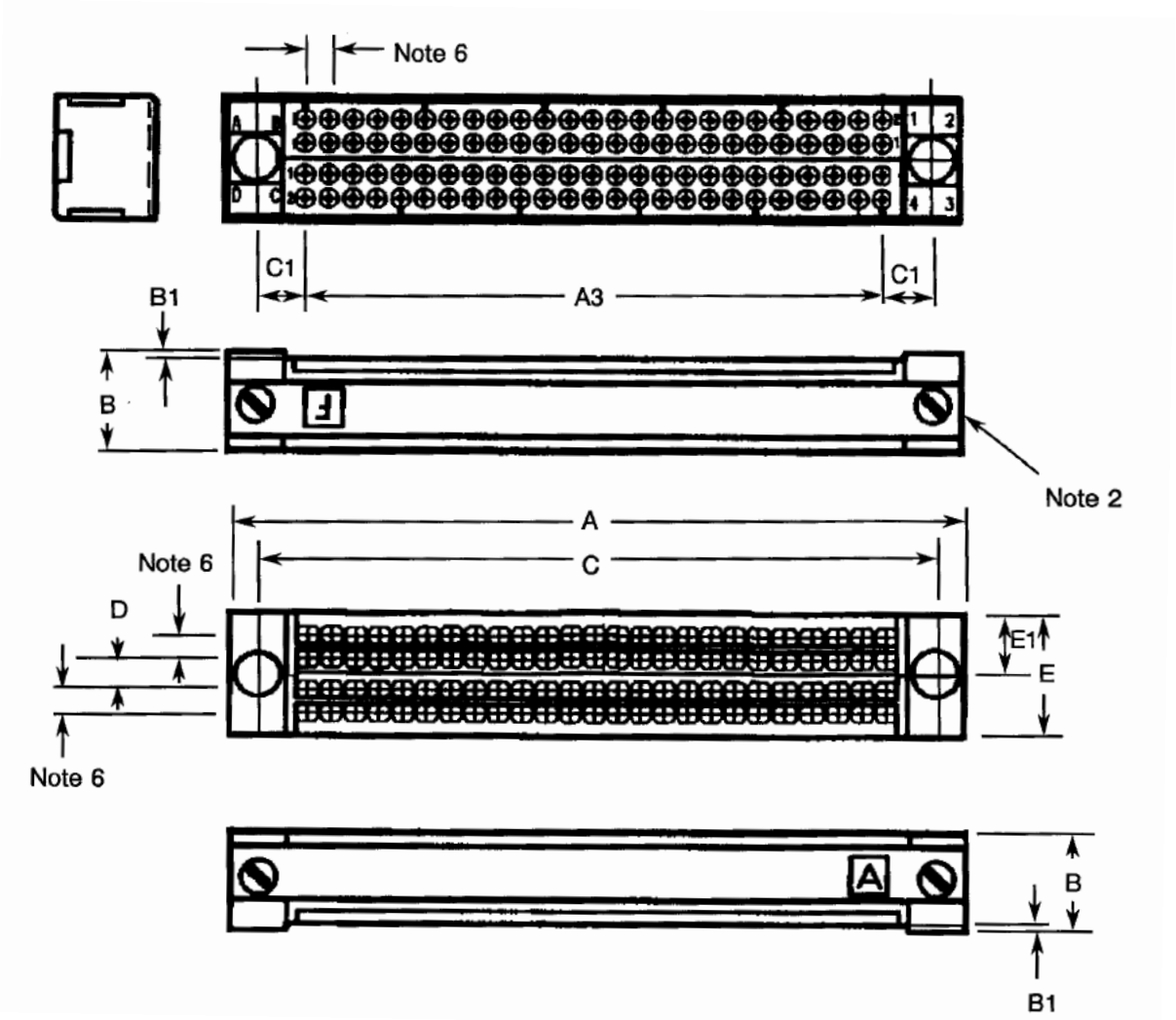


Symbol / Dim. (1)	A	A2	B	B1	C	C1	D	E	E1
Min.	35.1	22.66	7.75	0.3	30.65	3.77	2.34	9.9	4.9
Max.	35.4	23.06	8.05	0.6	30.95	4.17	2.74	10.1	5.1

NOTES:

1. All dimensions are in millimetres.
2. Torque: 10N.cm.
3. Underlined dimensions, in table, are critical to ensure intermateability.
4. The front of the insert shall be marked with the minimum marking shown.
5. Orientation of labelling of contacts and guiding devices is not a true representation.
6. Pitch: 1.905mm.

RECEPTACLE, 100 CONTACTS

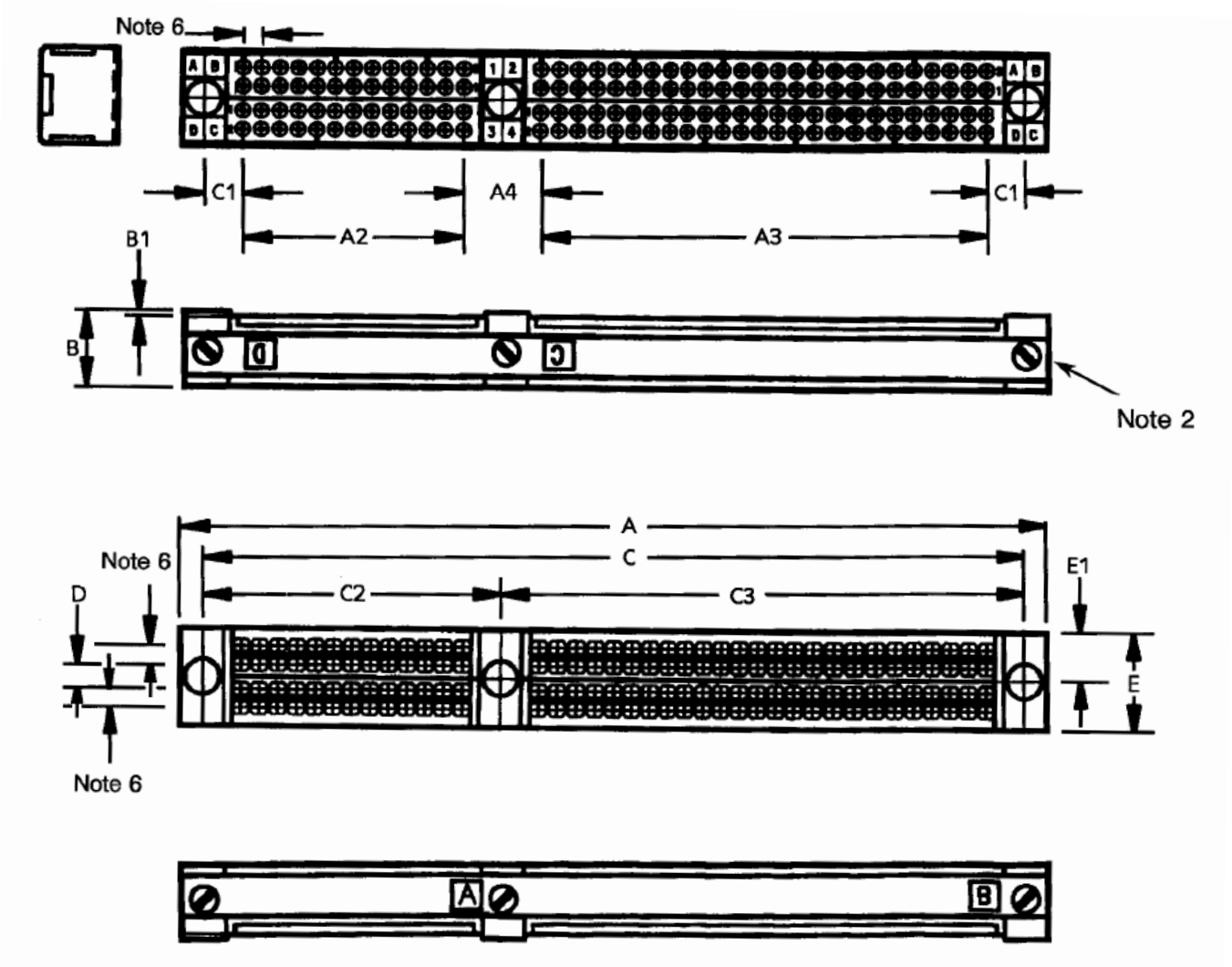


Symbol / Dim. (1)	A	A3	B	B1	C	C1	D	E	E1
Min.	57.9	45.52	7.75	0.3	53.51	3.77	2.34	9.9	4.9
Max.	58.2	45.92	8.05	0.6	53.81	4.17	2.74	10.1	5.1

NOTES:

1. All dimensions are in millimetres.
2. Torque: 10N.cm.
3. Underlined dimensions, in table, are critical to ensure intermateability.
4. The front of the insert shall be marked with the minimum marking shown.
5. Orientation of labelling of contacts and guiding devices is not a true representation.
6. Pitch: 1.905mm.

RECEPTACLE, 152 CONTACTS



Symbol / Dim. (1)	A	A2	A3	A4	B	B1	C	C1	C2	C3	D	E	E1
Min.	88.8	22.66	45.52	7.74	7.75	0.3	84.3	3.77	30.65	53.51	2.34	9.9	4.9
Max.	89.1	23.06	45.92	8.14	8.05	0.6	84.6	4.17	30.95	53.81	2.74	10.1	5.1

NOTES:

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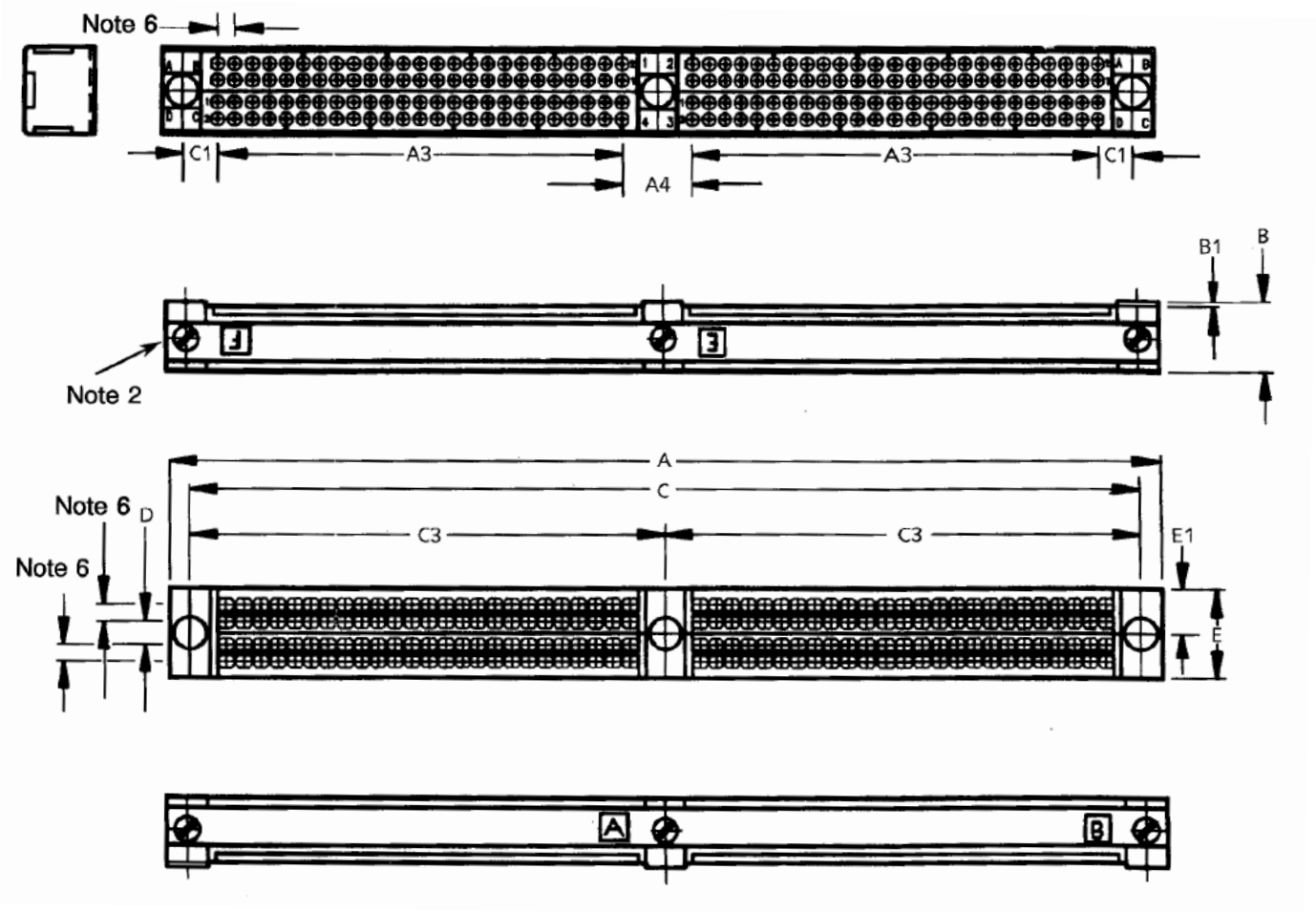
5. Orientation of labelling of contacts and guiding devices is not a true representation.
6. Pitch: 1.905mm.

RECEPTACLE, 200 CONTACTS

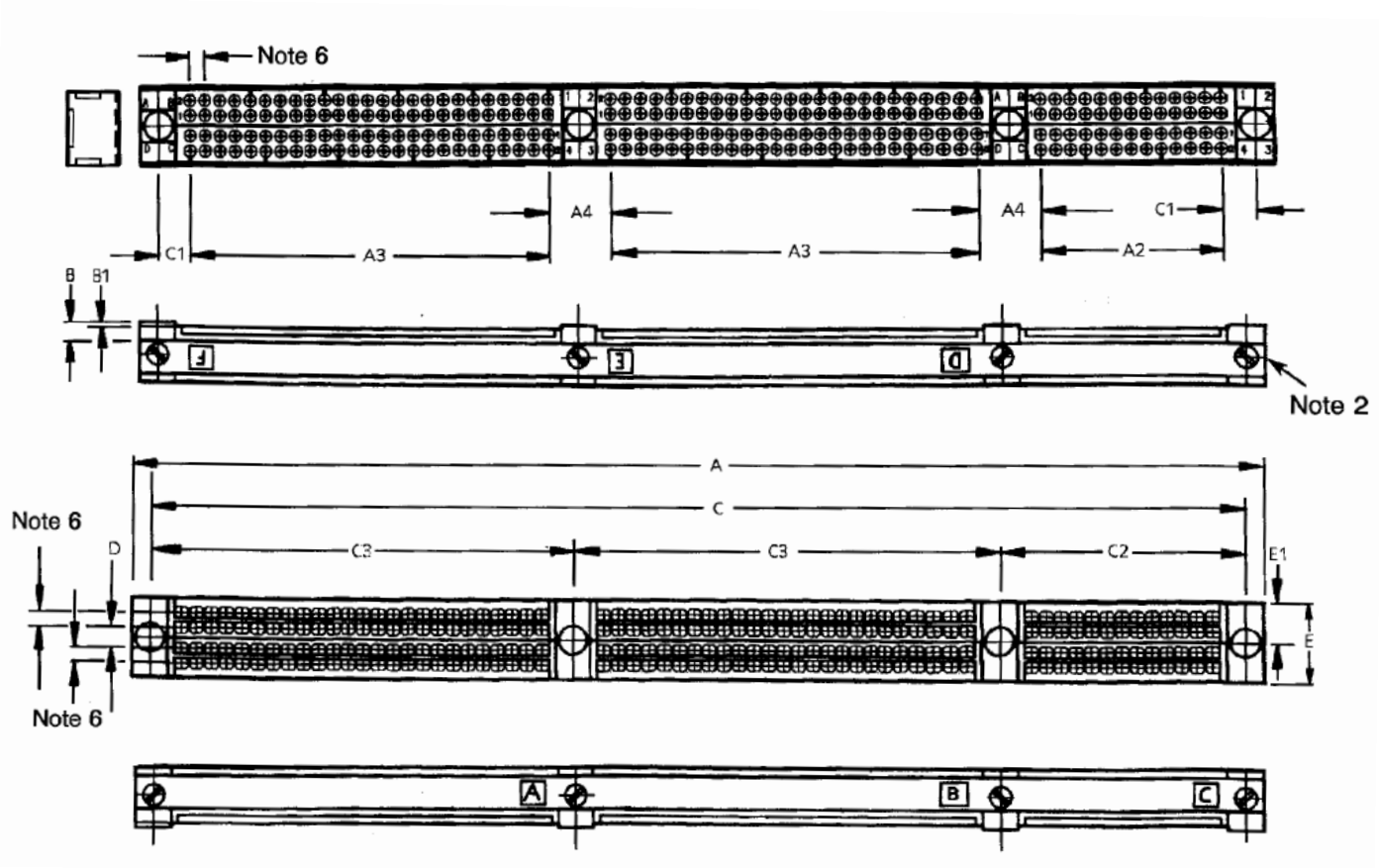


Symbol / Dim. (1)	A	A3	A4	B	B1	C	C1	C3	D	E	E1
Min.	111.6	45.52	7.74	7.75	0.3	107.16	3.77	53.51	2.34	9.9	4.9
Max.	111.9	45.92	8.14	8.05	0.6	107.46	4.17	53.81	2.74	10.1	5.1

NOTES:

1. All dimensions are in millimetres.
2. Torque: 10N.cm.
3. Underlined dimensions, in table, are critical to ensure intermateability.
4. The front of the insert shall be marked with the minimum marking shown.
5. Orientation of labelling of contacts and guiding devices is not a true representation.
6. Pitch: 1.905mm.

RECEPTACLE, 252 CONTACTS

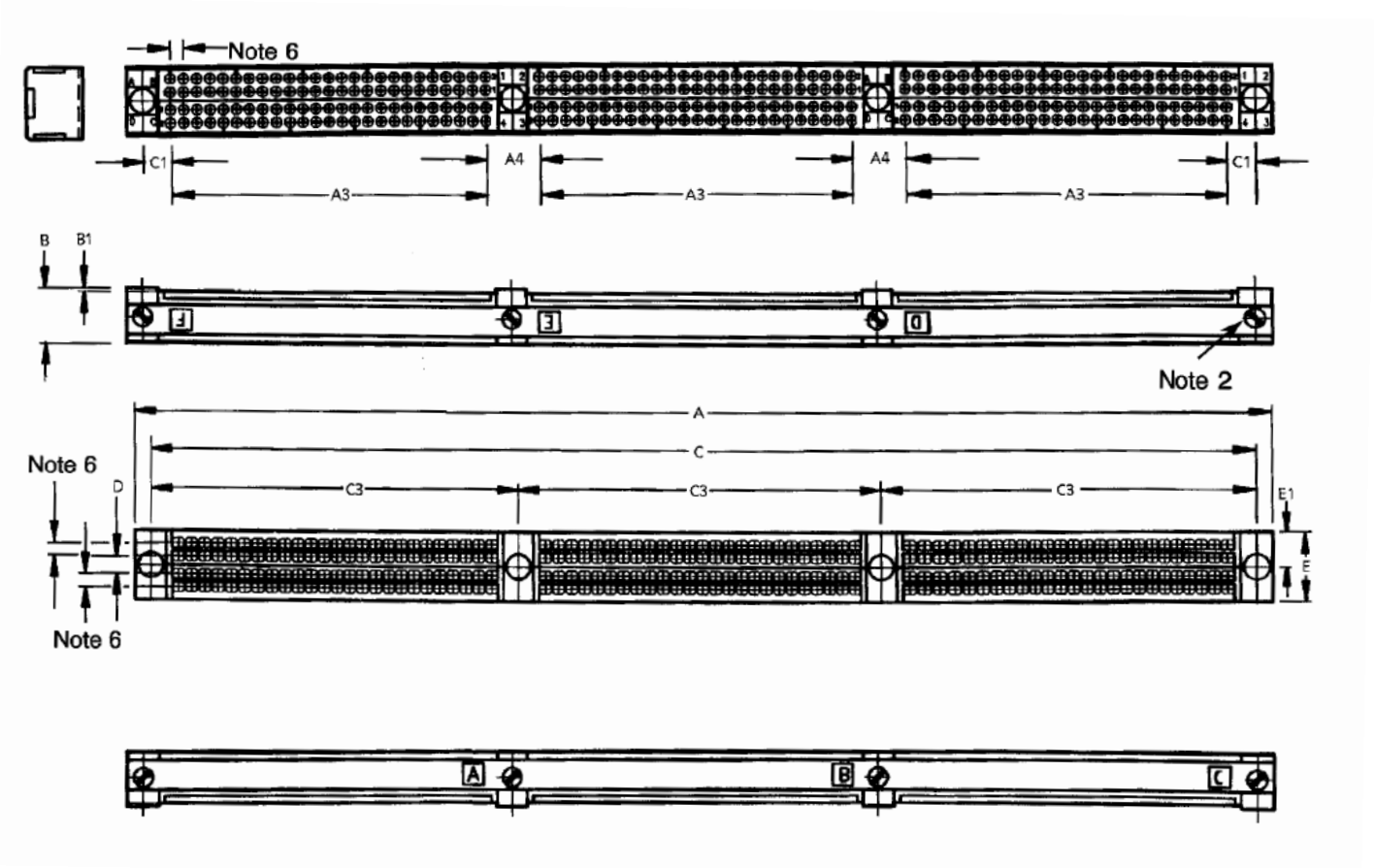


Symbol / Dim. (1)	A	A2	A3	A4	B	B1	C	C1	C2	C3	D	E	E1
Min.	142.5	22.66	45.52	7.74	7.75	0.3	137.96	3.77	30.65	53.51	2.34	9.9	4.9
Max.	142.8	23.06	45.92	8.14	8.05	0.6	138.26	4.17	30.95	53.81	2.74	10.1	5.1

NOTES:

1. All dimensions are in millimetres.
2. Torque: 10N.cm.
3. Underlined dimensions, in table, are critical to ensure intermateability.
4. The front of the insert shall be marked with the minimum marking shown.
5. Orientation of labelling of contacts and guiding devices is not a true representation.
6. Pitch: 1.905mm.

RECEPTACLE, 300 CONTACTS

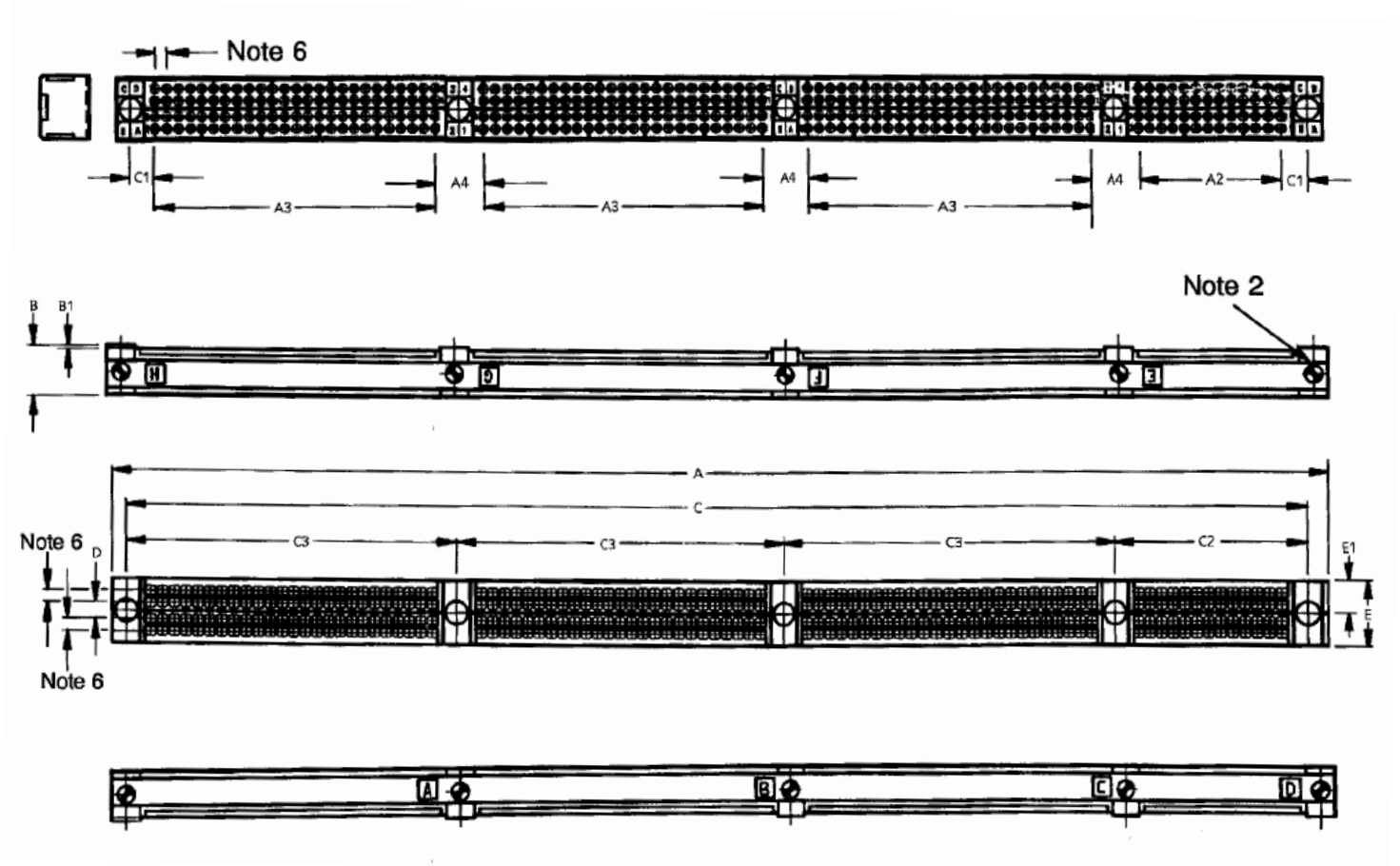


Symbol / Dim. (1)	A	A3	A4	B	B1	C	C1	C3	D	E	E1
Min.	165.3	45.52	7.74	7.75	0.3	160.82	3.77	53.51	2.34	9.9	4.9
Max.	165.6	45.92	8.14	8.05	0.6	161.12	4.17	53.81	2.74	10.1	5.1

NOTES:

1. All dimensions are in millimetres.
2. Torque: 10N.cm.
3. Underlined dimensions, in table, are critical to ensure intermateability.
4. The front of the insert shall be marked with the minimum marking shown.
5. Orientation of labelling of contacts and guiding devices is not a true representation.
6. Pitch: 1.905mm.

RECEPTACLE, 352 CONTACTS



Symbol / Dim. (1)	A	A2	A3	A4	B	B1	C	C1	C2	C3	D	E	E1
Min.	196.2	22.66	45.52	7.74	7.75	0.3	191.62	3.77	30.65	53.51	2.34	9.9	4.9
Max.	196.8	23.06	45.92	8.14	8.05	0.6	191.92	4.17	30.95	53.81	2.74	10.1	5.1

NOTES:

1. All dimensions are in millimetres.
2. Torque: 10N.cm.
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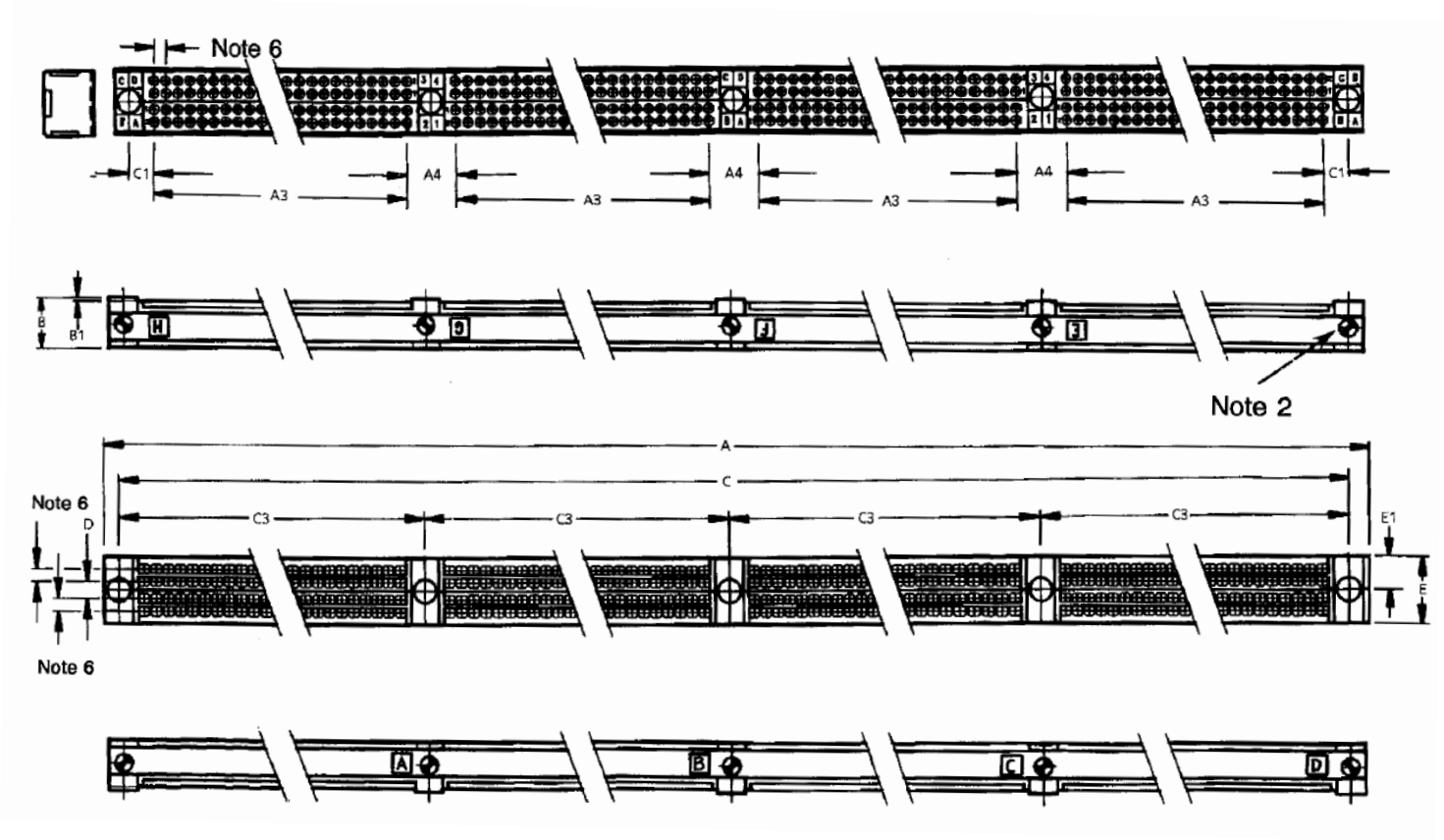
4. The front of the insert shall be marked with the minimum marking shown.
5. Orientation of labelling of contacts and guiding devices is not a true representation.
6. Pitch: 1.905mm.

RECEPTACLE, 400 CONTACTS

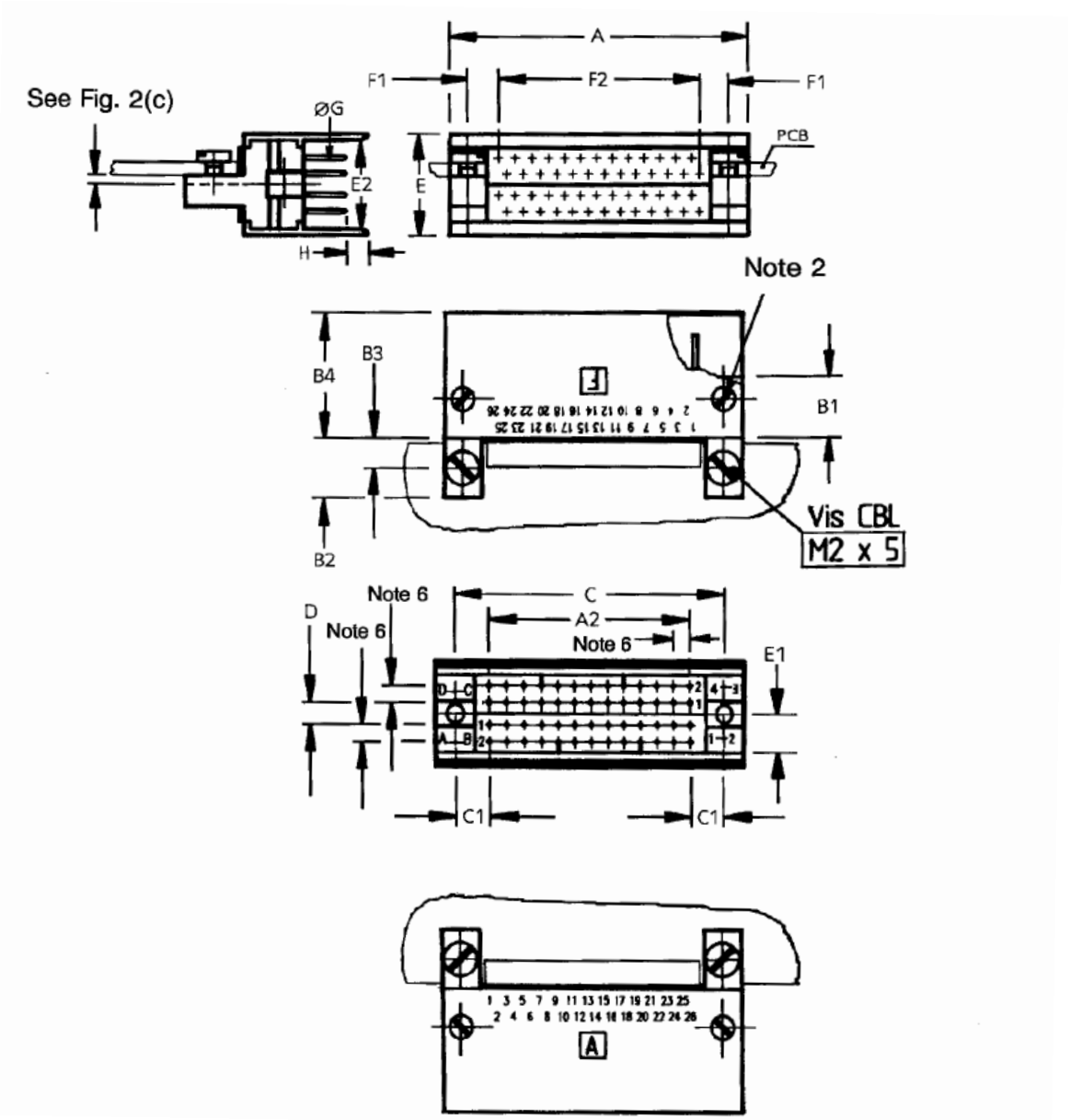


Symbol / Dim. (1)	A	A3	A4	B	B1	C	C1	C3	D	E	E1
Min.	219	45.52	7.74	7.75	0.3	214.48	3.77	53.51	2.34	9.9	4.9
Max.	219.3	45.92	8.14	8.05	0.6	214.78	4.17	53.81	2.74	10.1	5.1

NOTES:

1. All dimensions are in millimetres.
2. Torque: 10N.cm.
3. Underlined dimensions, in table, are critical to ensure intermateability.
4. The front of the insert shall be marked with the minimum marking shown.
5. Orientation of labelling of contacts and guiding devices is not a true representation.
6. Pitch: 1.905mm.

PLUG, 52 CONTACTS



Symbol / Dim. (1)	A	A2	B1	B2	B3	B4	C	C1	D	E	E1	E2	F1	F2	ØG	H
Min.	35.1	22.66	7	-	3.5	14.3	30.65	3.77	2.34	-	5.05	10.2	3.29	23.61	0.42	2
Max.	35.4	23.06	7.2	7.4	3.6	14.6	30.95	4.17	2.74	12	5.25	10.45	3.69	24.01	0.44	3

NOTES:

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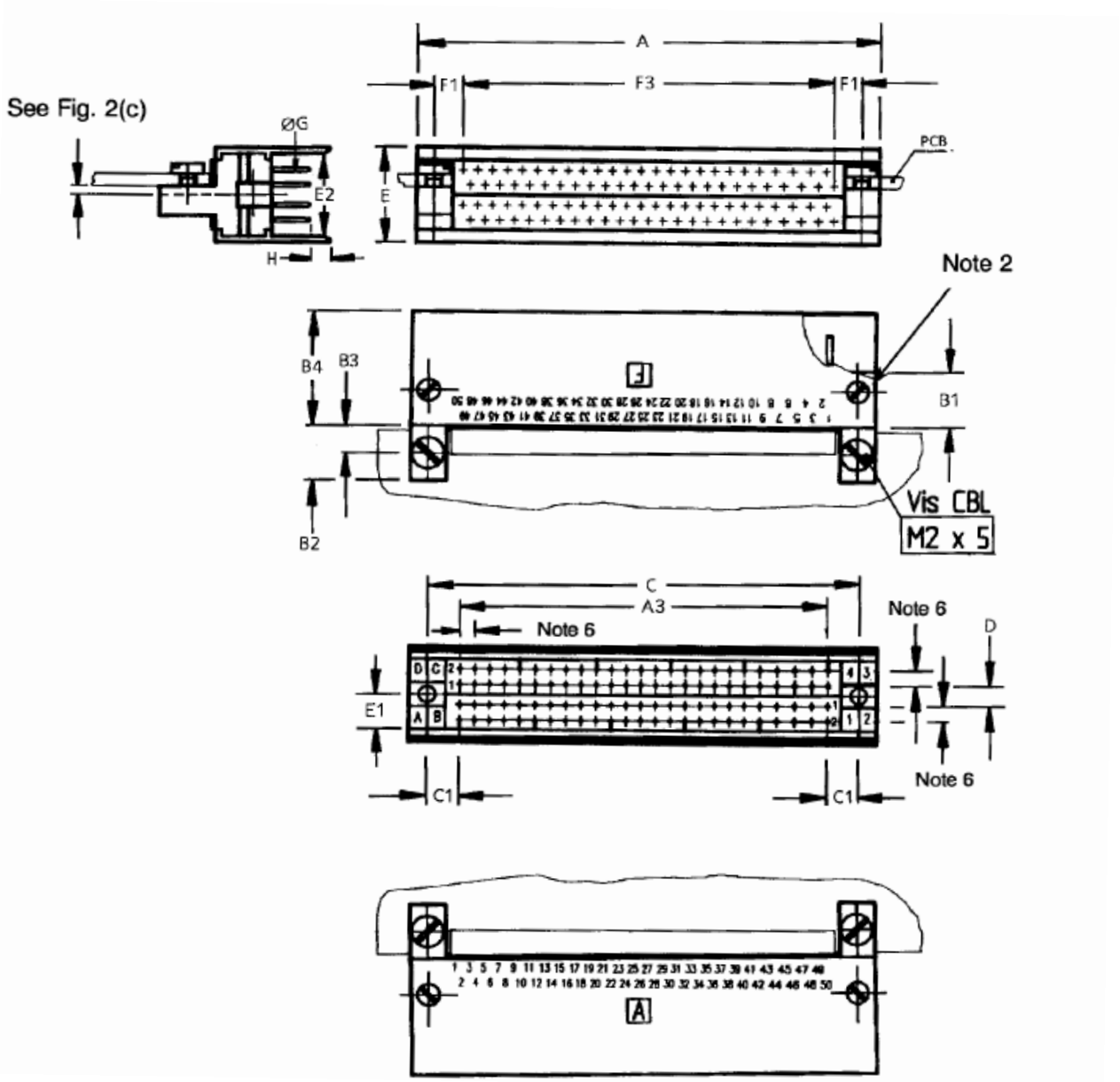
5. Orientation of labelling of contacts and guiding devices is not a true representation.
6. Pitch: 1.905mm.

PLUG, 100 CONTACTS



Symbol / Dim. (1)	A	A3	B1	B2	B3	B4	C	C1	D	E	E1	E2	F1	F3	ØG	H
Min.	57.9	45.52	7	-	3.5	14.3	53.51	3.77	2.34	-	5.05	10.2	3.29	46.47	0.42	2
Max.	58.2	45.92	7.2	7.4	3.6	14.6	53.81	4.17	2.74	12	5.25	10.45	3.69	46.87	0.44	3

NOTES:

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2. Torque: 10N.cm.
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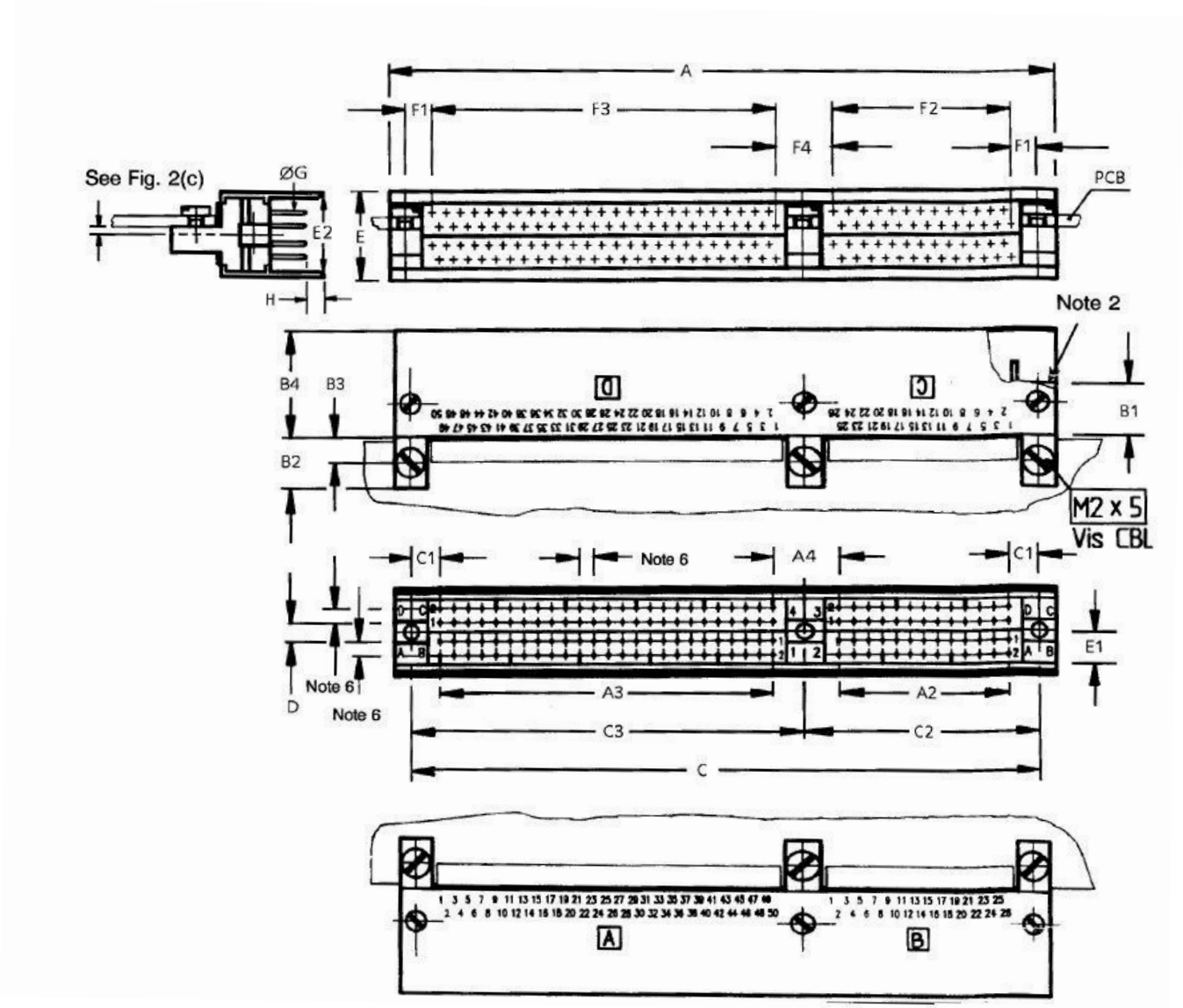
4. The front of the insert shall be marked with the minimum marking shown.
5. Orientation of labelling of contacts and guiding devices is not a true representation.
6. Pitch: 1.905mm.

PLUG, 152 CONTACTS



Symbol / Dim. (1)	A	A2	A3	A4	B1	B2	B3	B4	C	C1	C2	C3	D	E	E1	E2	F1	F2	F3	F4	ØG	H
Min.	88.8	22.66	45.52	7.74	7	-	3.5	14.3	84.305	3.77	30.65	53.51	2.34	-	5.05	10.2	3.29	23.61	46.47	6.79	0.42	2
Max.	89.1	23.06	45.92	8.14	7.2	7.4	3.6	14.6	84.605	4.17	30.95	53.81	2.74	12	5.25	10.45	3.69	24.01	46.87	7.19	0.44	3

NOTES:

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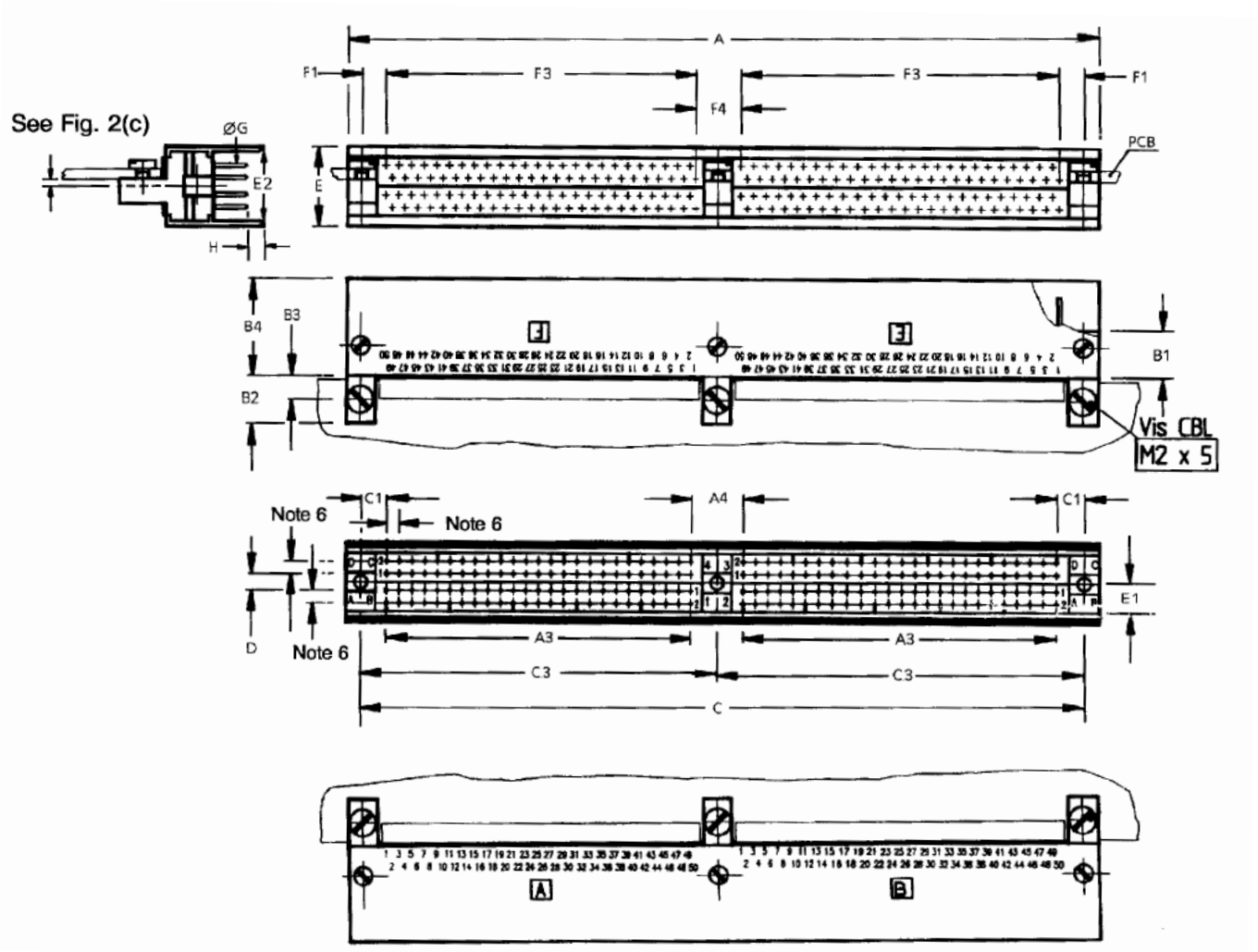
5. Orientation of labelling of contacts and guiding devices is not a true representation.
6. Pitch: 1.905mm.

PLUG, 200 CONTACTS

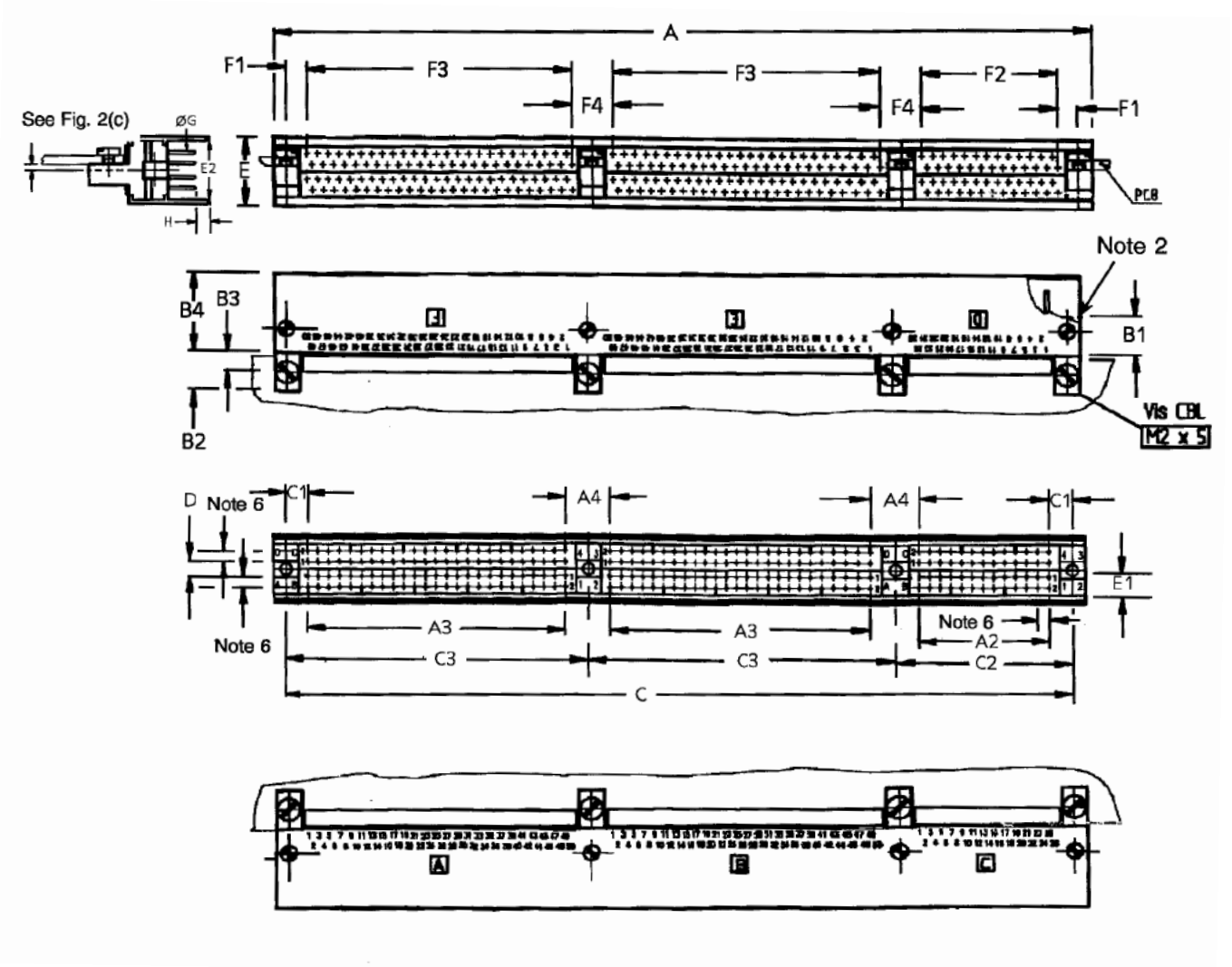


Symbol / Dim. (1)	A	A3	A4	B1	B2	B3	B4	C	C1	C3	D	E	E1	E2	F1	F3	F4	ØG	H
Min.	111.6	45.52	7.74	7	-	3.5	14.3	107.17	3.77	53.51	2.34	-	5.05	10.2	3.29	46.47	6.79	0.42	2
Max.	111.9	45.92	8.14	7.2	7.4	3.6	14.6	107.47	4.17	53.81	2.74	12	5.25	10.45	3.69	46.87	7.19	0.44	3

NOTES:

1. All dimensions are in millimetres.
2. Torque: 10N.cm.
3. Underlined dimensions, in table, are critical to ensure intermateability.
4. The front of the insert shall be marked with the minimum marking shown.
5. Orientation of labelling of contacts and guiding devices is not a true representation.
6. Pitch: 1.905mm.

PLUG, 252 CONTACTS

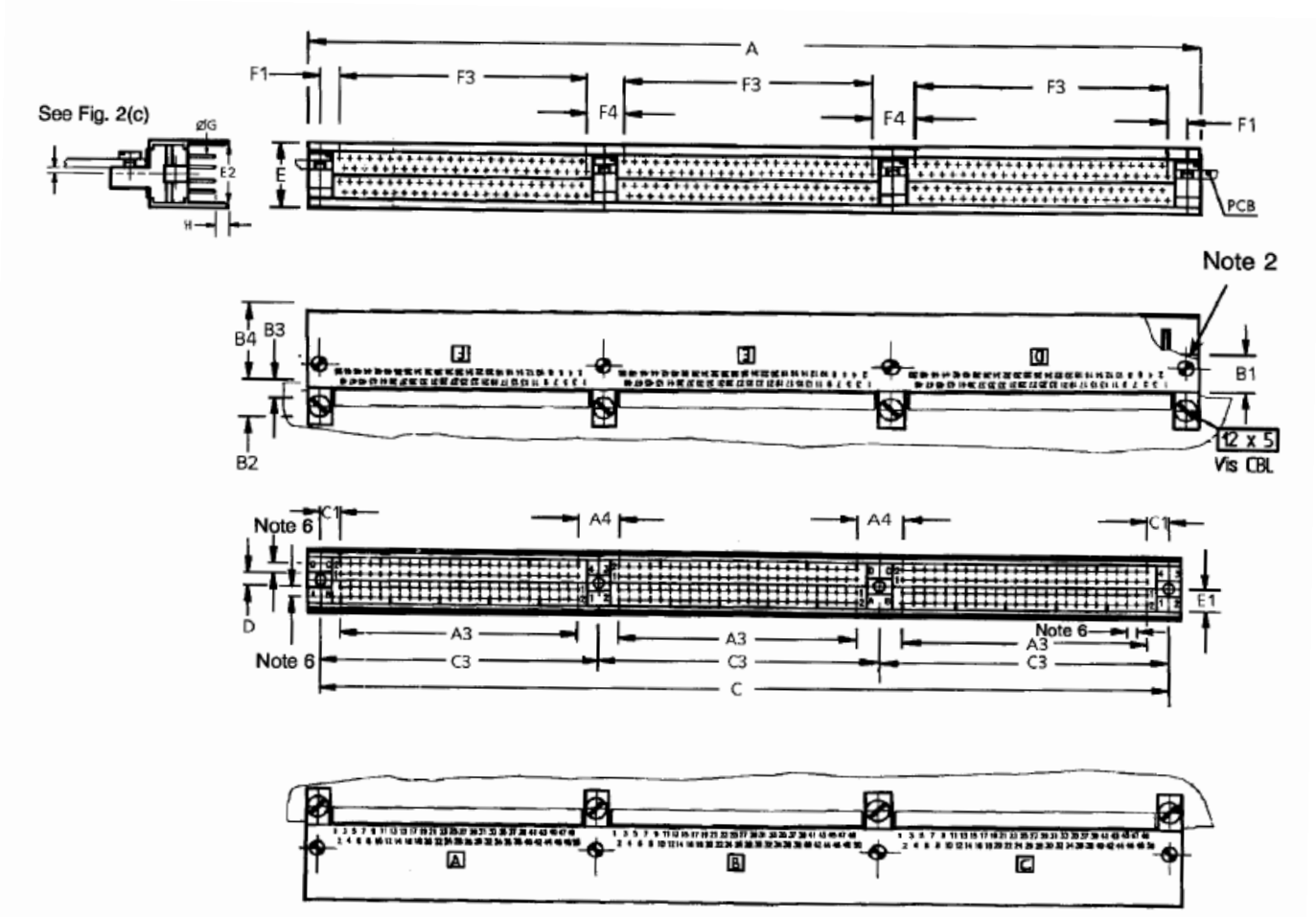


Symbol / Dim. (1)	A	A2	A3	A4	B1	B2	B3	B4	C	C1	C2	C3	D	E	E1	E2	F1	F2	F3	F4	ØG	H
Min.	142.5	22.66	45.52	7.74	7	-	3.5	14.3	137.96	3.77	30.65	53.51	2.34	-	5.05	10.2	3.29	23.61	46.47	6.79	0.42	2
Max.	142.8	23.06	45.92	8.14	7.2	7.4	3.6	14.6	138.26	4.17	30.95	53.81	2.74	12	5.25	10.45	3.69	24.01	46.87	7.19	0.44	3

NOTES:

1. All dimensions are in millimetres.
2. Torque: 10N.cm.
3. Underlined dimensions, in table, are critical to ensure intermateability.
4. The front of the insert shall be marked with the minimum marking shown.
5. Orientation of labelling of contacts and guiding devices is not a true representation.
6. Pitch: 1.905mm.

PLUG, 300 CONTACTS

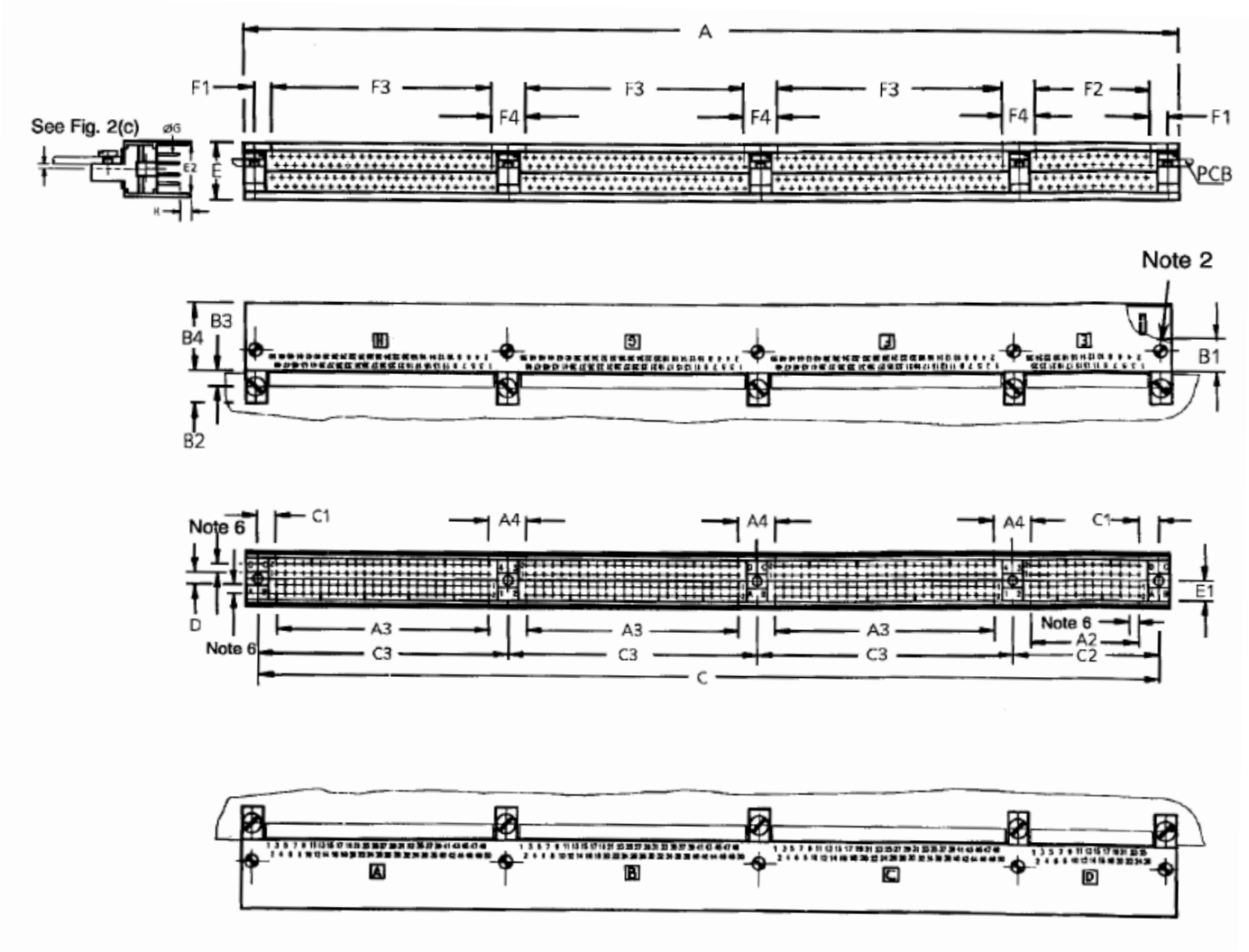


Symbol / Dim. (1)	A	A3	A4	B1	B2	B3	B4	C	C1	C3	D	E	E1	E2	F1	F3	F4	ØG	H
Min.	165.3	45.52	7.74	7	-	3.5	14.3	160.82	3.77	53.51	2.34	-	5.05	10.2	3.29	46.47	6.79	0.42	2
Max.	165.6	45.92	8.14	7.2	7.4	3.6	14.6	161.12	4.17	53.81	2.74	12	5.25	10.45	3.69	46.87	7.19	0.44	3

NOTES:

1. All dimensions are in millimetres.
2. Torque: 10N.cm.
3. Underlined dimensions, in table, are critical to ensure intermateability.
4. The front of the insert shall be marked with the minimum marking shown.
5. Orientation of labelling of contacts and guiding devices is not a true representation.
6. Pitch: 1.905mm.

PLUG, 352 CONTACTS

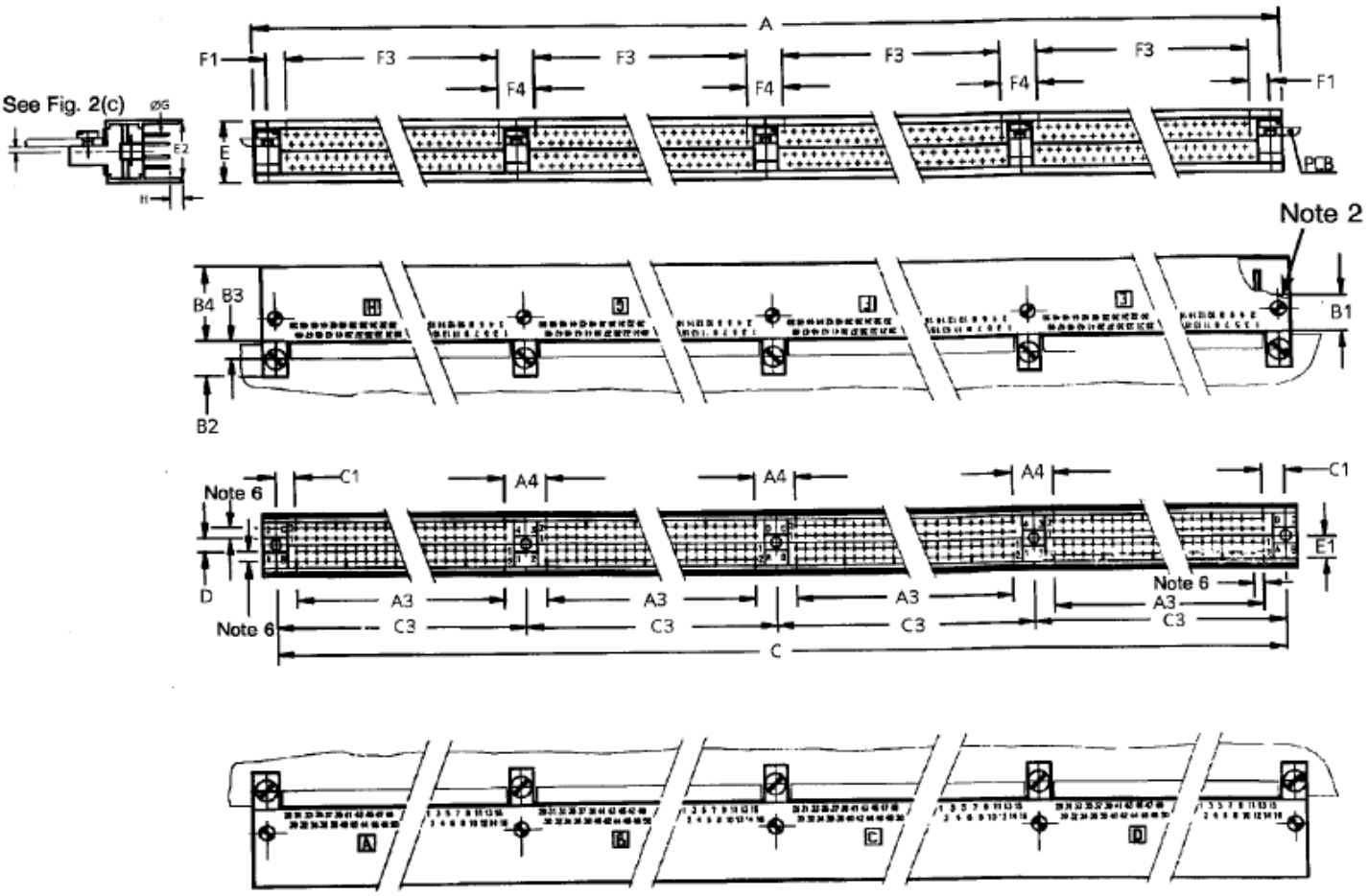


Symbol / Dim. (1)	A	A2	A3	A4	B1	B2	B3	B4	C	C1	C2	C3	D	E	E1	E2	F1	F2	F3	F4	ØG	H
Min.	196.2	22.66	45.52	7.74	7	-	3.5	14.3	191.62	3.77	30.65	53.51	2.34	-	5.05	10.2	3.29	23.61	46.47	6.79	0.42	2
Max.	196.5	23.06	45.92	8.14	7.2	7.4	3.6	14.6	191.92	4.17	30.95	53.81	2.74	12	5.25	10.45	3.69	24.01	46.87	7.19	0.44	3

NOTES:

1. All dimensions are in millimetres.
2. Torque: 10N.cm.
3. Underlined dimensions, in table, are critical to ensure intermateability.
4. The front of the insert shall be marked with the minimum marking shown.
5. Orientation of labelling of contacts and guiding devices is not a true representation.
6. Pitch: 1.905mm.

PLUG, 400 CONTACTS



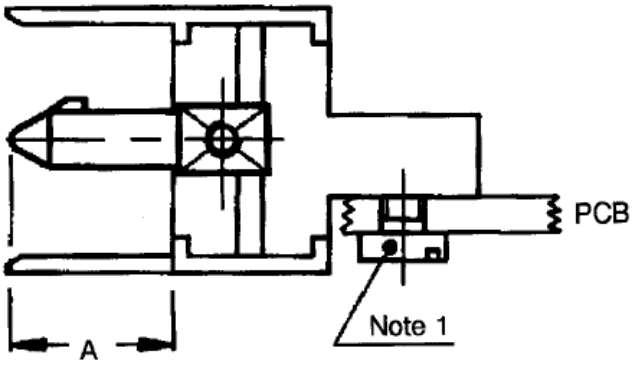
Symbol / Dim. (1)	A	A3	A4	B1	B2	B3	B4	C	C1	C3	D	E	E1	E2	F1	F3	F4	ØG	H
Min.	219	45.52	7.74	7	-	3.5	14.3	214.48	3.77	53.51	2.34	-	5.05	10.2	3.29	46.47	6.79	0.42	2
Max.	219.3	45.92	8.14	7.2	7.4	3.6	14.6	214.78	4.17	53.81	2.74	12	5.25	10.45	3.69	46.87	7.19	0.44	3

NOTES:

1. All dimensions are in millimetres.
2. Torque: 10N.cm.
3. Underlined dimensions, in table, are critical to ensure intermateability.
4. The front of the insert shall be marked with the minimum marking shown.
5. Orientation of labelling of contacts and guiding devices is not a true representation.
6. Pitch: 1.905mm.

FIGURE 2(b) – GUIDING AND LOCKING DEVICES

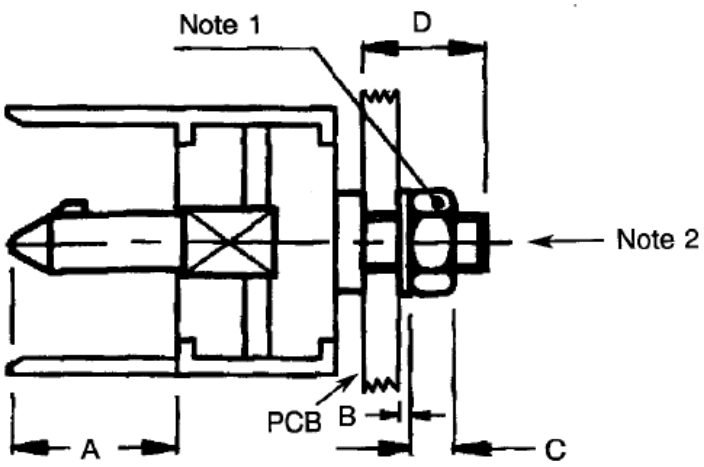
CODE 110



Symbol	Millimetres	
	Min.	Max.
A	7	7.35

NOTES:
1. Torque: 15N.cm.

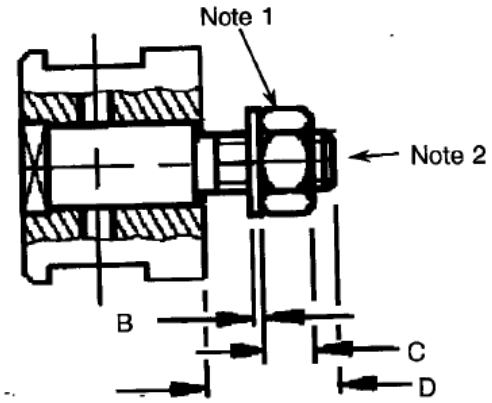
CODE 111



Symbol	Millimetres	
	Min.	Max.
A	7	7.35
B	0.45	0.55
C	1.9	2.1
D	-	5.5

NOTES:
1. Torque: 25N.cm.
2. M2.5.

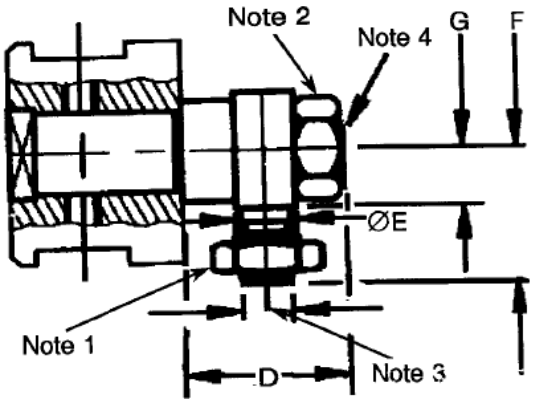
CODE 121



Symbol	Millimetres	
	Min.	Max.
B	0.45	0.55
C	1.9	2.1
D	-	5.5

NOTES:
1. Torque: 25N.cm.
2. M2.5.

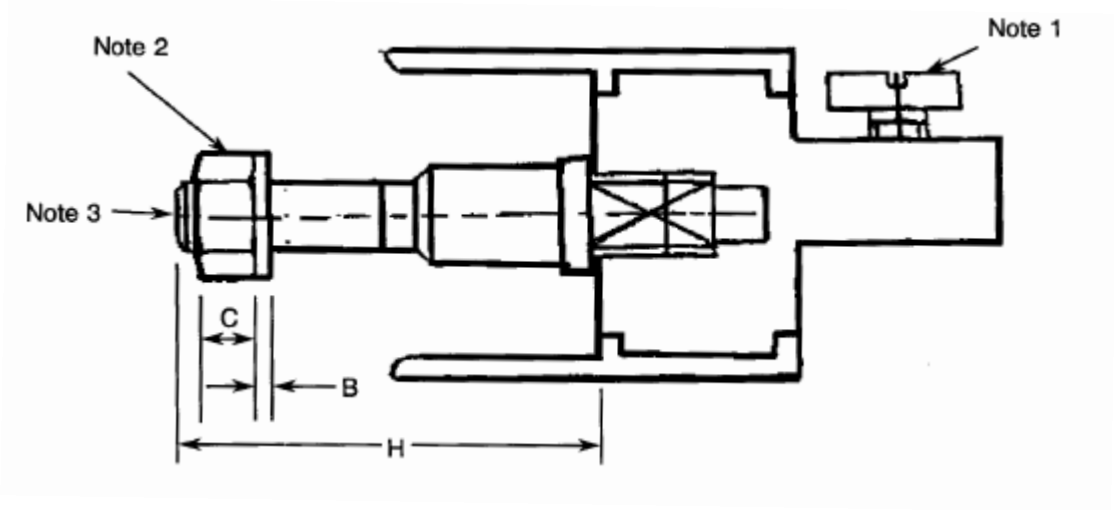
CODES 124 AND 134



Symbol	Millimetres		Notes
	Min.	Max.	
D	-	7	
ØE	2.45	2.55	
F	-	6	Code 124
F	-	6.6	Code 134
G	2.6	2.7	

NOTES:
1. Torque: 15N.cm.
2. Torque: 25N.cm.
3. M2.
4. M2.5.

CODE 201



Symbol	Millimetres	
	Min.	Max.
B	0.45	0.55
C	1.9	2.1
H	-	15

NOTES:

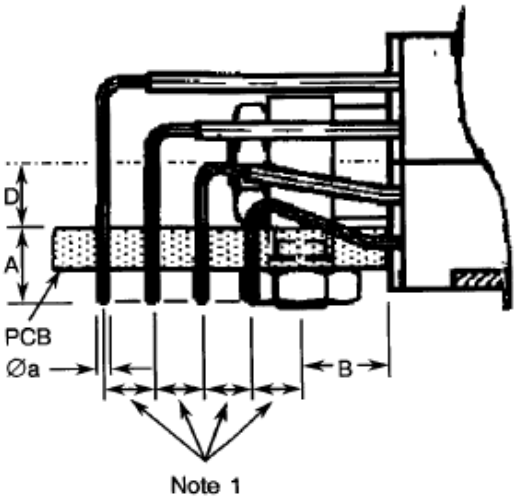
1. Torque: 15N.cm.
2. Torque: 25N.cm.
3. M2.5.

FIGURE 2(c) – CONTACT MOUNTING CONFIGURATIONS – VIEW OF REAR PART OF CONNECTOR

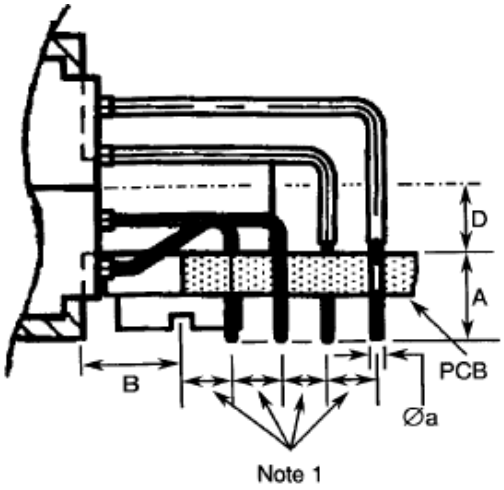
CODES 10, 11 AND 12

RIGHT-ANGLE SOLDER CONTACTS

RECEPTACLE SIDE



PLUG SIDE



		Code 10 Plug and Receptacle		Code 11 Receptacle Only		Code 12 Plug Only	
		Millimetres					
Symbol		Min.	Max.	Min.	Max.	Min.	Max.
A		2.6	3.8	3.1	4.3	4.1	5.3
B	Plug	3.4	3.6	-	-	3.4	3.6
	Recept.	3.2	3.8	3.2	3.8	-	-

Symbol	Millimetres	
	Minimum	Maximum
Øa	0.36	0.44
D	2.6	2.7

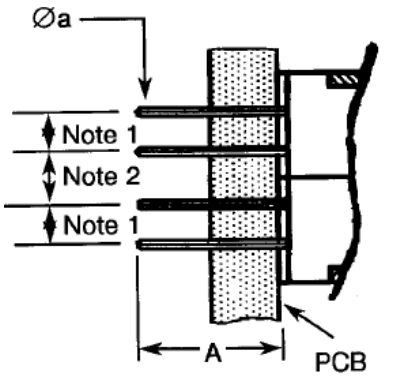
NOTES:

1. Pitch: 1.905mm.

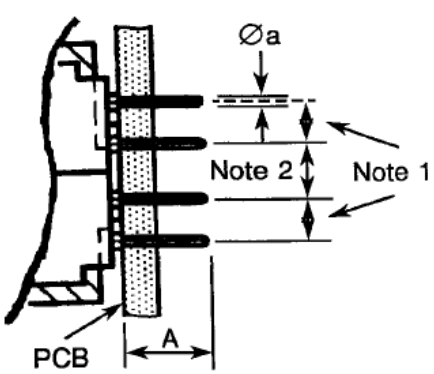
CODES 30 AND 31

STRAIGHT SOLDER CONTACTS

RECEPTACLE SIDE



PLUG SIDE



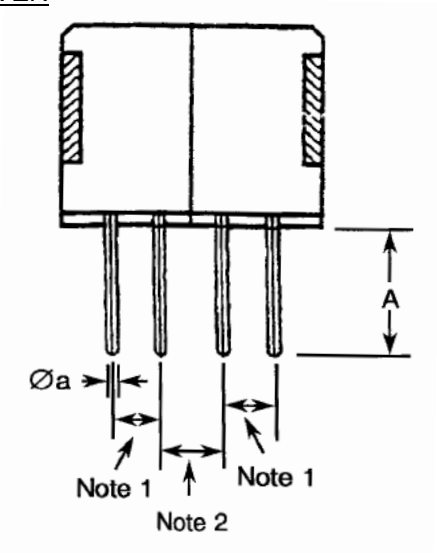
	Code 30		Code 31		Code 31	
	Plug and Receptacle		Receptacle		Plug	
	Millimetres					
Symbol	Min.	Max.	Min.	Max.	Min.	Max.
A	3.5	4	6.1	6.6	4.6	5.1

Symbol	Millimetres	
	Minimum	Maximum
Øa	0.36	0.44

NOTES:
1. Pitch: 1.905mm.
2. Pitch: 2.54mm.

CODE 91 – SAVER

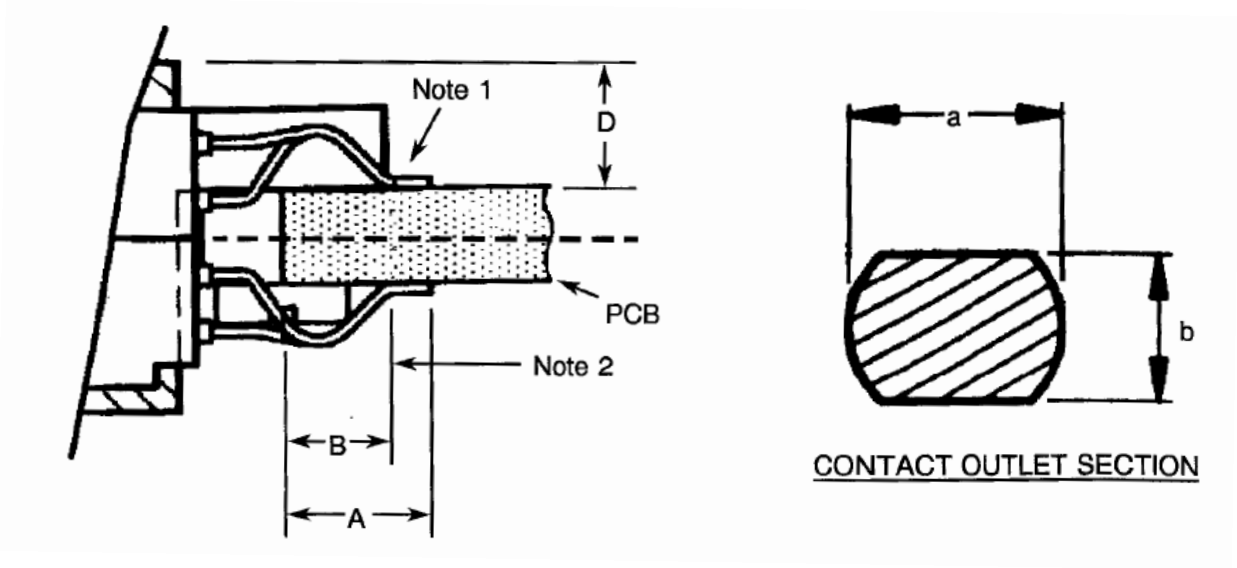
Symbol	Millimetres	
	Minimum	Maximum
A	4.5	5.5
Øa	0.42	1.44



NOTES:
1. Pitch: 1.905mm.
2. Pitch: 2.54mm.

CODE 43

SURFACE MOUNT – APPLICABLE TO PLUGS ONLY



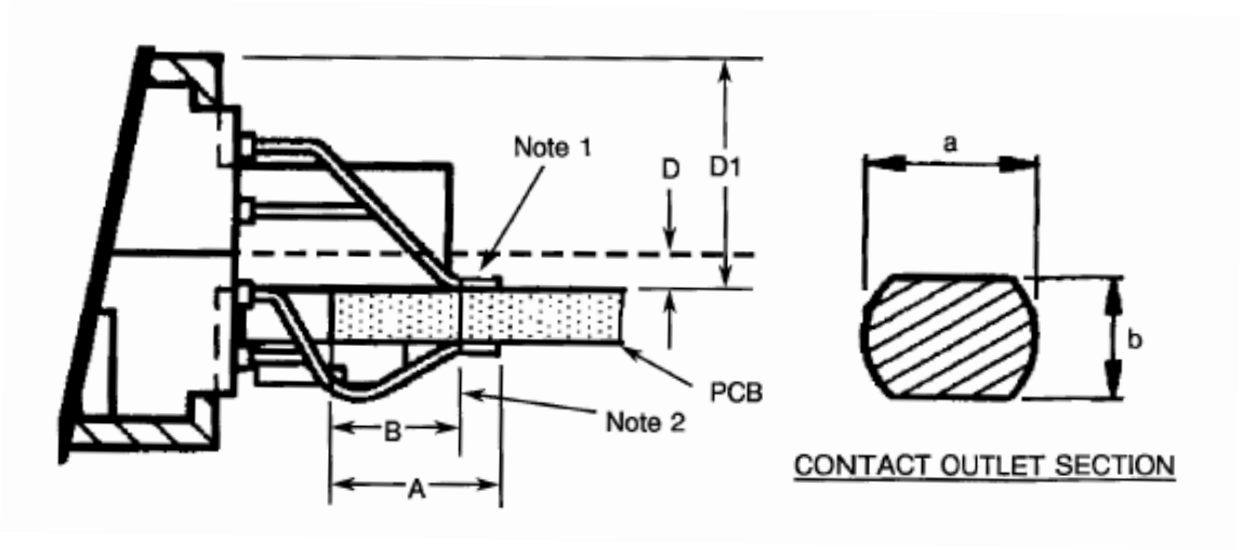
Symbol	Millimetres	
	Min.	Max.
a	0.25	0.45
A	-	5.5
b	0.2	0.4
B	3	4.1
D	-	4.8

NOTES:

1. See section. Pitch: 0.9525mm.
2. Contact point.

CODES 45 AND 47

SURFACE MOUNT OFF-CENTRE – APPLICABLE TO PLUGS ONLY



	Code 45		Code 47	
	Millimetres			
Symbol	Min.	Max.	Min.	Max.
A	-	5	-	5

Symbol	Millimetres	
	Minimum	Maximum
a	0.25	0.45
b	0.2	0.4
B	3	4.1
D	0.9	1.2
D1	-	7

NOTES:
1. See section. Pitch: 0.9525mm.
2. Contact point.

4 REQUIREMENTS

4.1 GENERAL

The complete requirements for procurement of the connectors specified herein are stated in this specification and ESCC Generic Specification No. 3401. Deviations from the Generic Specification, applicable to this specification only, are listed in Para. 4.2.

Deviations from the applicable Generic Specification and this Detail Specification, formally agreed with specific Manufacturers on the basis that the alternative requirements are equivalent to the ESCC requirements and do not affect the components' reliability, are listed in the appendices attached to this specification.

4.2 DEVIATIONS FROM GENERIC SPECIFICATION

4.2.1 Deviations from Special In-process Controls
None.

4.2.2 Deviations from Final Production Tests (Chart II)
(a) Para. 9.1.1.4, Mated Shell Conductivity: Not applicable.
(b) Para. 9.4, Contact Capability: Sampling in accordance with Para. 9.6 of ESCC No. 3401.
(c) Para. 9.5, Magnetism Level: Not applicable.
(d) Para. 9.9, Seal Test: Not applicable.

4.2.3 Deviations from Burn-in and Electrical Measurements (Chart III)
Chart III is not applicable.

4.2.4 Deviations from Qualification Tests (Chart IV)
(a) Para. 9.1.1.4, Mated Shell Conductivity: Not applicable.
(b) Para. 9.9, Seal Test: Not applicable.
(c) Para. 9.15, Joint Strength: Not applicable.
(d) Para. 9.24, Jackscrew Retention: Not applicable.
(e) Para. 9.27, Maintenance Aging: Not applicable
(f) Para. 9.30, Probe Damage: Not applicable.

4.2.5 Deviations from Lot Acceptance Tests (Chart V)
(a) Para. 9.1.1.4, Mated Shell Conductivity: Not applicable.
(b) Para. 9.9, Seal Test: Not applicable.
(c) Para. 9.15, Joint Strength: Not applicable.
(d) Para. 9.27, Maintenance Aging: Not applicable.
(e) Para. 9.30, Probe Damage: Not applicable.

4.3 MECHANICAL REQUIREMENTS

4.3.1 Dimension Check
The dimensions of the connectors specified herein shall be verified in accordance with the requirements set out in Para. 9.6 of ESCC Generic Specification No. 3401 and shall conform to those shown in Figure 2 of this specification. Only the following dimensions shall be checked during procurement:

Figure 2(a)
- Between centres of guiding or locking device. (Dimensions C, C2 and C3).
- Dimension E1 (where applicable).

Figure 2(b)
- Protrusion of guiding/locking devices.
- Overall dimensions of guiding/locking devices.

Figure 2(c)
All dimensions, except pitch.

4.3.2 Weight
The maximum weight of the connectors, with contacts and guiding and locking devices specified herein, shall be as specified in Table 1(a).

4.3.3 Contact Capability
For the purpose of this test, the pick-up and drop weights shall be as follows.

	Pick-up Weight	Drop Weight
Weight (g)	5	70
Pin Diameter (mm)	0.415 - 0.42	0.44 - 0.445
Insertion Depth (mm)	5	5

4.3.4 Contact Retention (In Insert)
The contact retention force (compression) within the insert shall be 40N.

4.3.5 Mating and Unmating Forces
The forces applied for mating and unmating of the connectors shall not exceed the values specified in Table 1(a).

4.3.6 Insert Retention (In Shell)
Connector inserts shall withstand a pressure of 25N/cm^2 without being dislodged from the shell.

4.3.7 Jackscrew Retention
Not applicable.

4.3.8 Contact Insertion and Withdrawal Forces
Not applicable.

4.3.9 Engagement and Separation Forces
The diameter of the test pin and the engagement and separation forces of the female contacts shall be as specified hereunder.

	Diameter (mm)		Engagement	Separation (N)	
	Min.	Max.	Max. (N)	Min.	Max.
Minimum Diameter Test Pin	0.415	0.42	-	0.05	-
Maximum Diameter Test Pin	0.44	0.445	0.7	-	0.7

4.3.10 Oversize Pin Exclusion
The diameter of the test pin shall be 0.598mm minimum and 0.602mm maximum and the force applied to it shall be 0.7N.

4.3.11 Probe Damage
Not applicable.

4.3.12 Solderability
No special conditions.

4.4 MATERIALS AND FINISHES
The materials and finishes shall be as specified herein. Where a definite material is not specified, a material which will enable the connectors specified herein to meet the performance requirements of this specification shall be used. Acceptance or approval of any constituent material does not guarantee acceptance of the finished product.

4.4.1 Shells
Shells shall be made of aluminium alloy with an appropriate surface treatment against corrosion.

4.4.2 Inserts
The inserts shall be made of glass-fibre-filled diallylphthalate resin.

4.4.3 Contacts

4.4.3.1 Body
The contact body shall be made of copper alloy.

- Male Contact and Saver: The plating shall be 1.27µm minimum gold over 1.27µm minimum nickel.
- Female Contact: The plating shall be 0.25µm minimum gold over 1.27µm minimum nickel.

4.4.3.2 Female Contact Wire
The wire shall be made of copper alloy.

The plating shall be 1.27µm minimum gold over 0.2µm minimum nickel.

4.4.3.3 Female Contact Sleeve
The sleeve shall be made of copper alloy. The plating shall be 0.25µm minimum gold over 0.8µm minimum nickel.

4.4.3.4 Tinned Terminations (Insert Codes 46 and 57)
Solder dipped, tin/lead 63/37, minimum thickness 1µm, minimum length 3.5mm.

4.4.4 Contact Retaining Clip
Not applicable.

4.4.5 Guiding and Locking Devices
Guiding and locking devices shall be made of brass (nickel-plated), stainless steel or arcap alloy.

4.4.6 Magnetism Level
Not applicable.

4.5 MARKING

4.5.1 General
The marking of all components delivered to this specification shall be in accordance with the requirements of ESCC Basic Specification No. 21700 and the following paragraphs. When the component is too small to accommodate all of the marking as specified, as much as space permits shall be marked and the marking information, in full, shall accompany the component in its primary package.

The information to be marked, and the order of precedence, shall be as follows:

(a) Contact Position.
(b) The ESCC Component Number.
(c) Characteristics.
(d) Traceability information.

4.5.2 Contact Position
Contact position shall be marked on the inserts in accordance with Figure 2(a).

4.5.3 The ESCC Component Number

Each component shall be marked with the ESCC Component Number which shall be constituted and marked as follows:

Example: 340106501B

- Detail Specification Number: 3401065
- Type Variant (Note 1): 01
- Testing Level: B

NOTES:

1. Marking of the Type Variant is mandatory. No further reference to type variants is made in this specification.

4.5.4 Characteristics

The characteristics to be marked in the following order of precedence are (example):

052 44 10 110

- Number of contacts (52): 052
- Insert type: 44
- Type of contacts: 10
- Guiding and locking devices: 110

4.5.4.1 Number of Contacts

052 – 100 – 152 – 200 – 252 – 300 – 352 – 400.

4.5.4.2 Insert

Inserts shall be designated by the following code numbers.

Code No.	Description
44	Receptacle (female contacts)
46	Receptacle (female contact pre-tinned termination)
55	Plug (male contacts)
57	Plug (male contact pre-tinned termination)

4.5.4.3 Contacts

Contact rear configurations shall be designated by the codes given in Table 1(a) and Figure 2(c).

4.5.4.4 Guiding and Locking Devices

Guiding and locking devices shall be designated by the codes given in Figure 2(b).

N.B.

If the purchase order does not specify any guiding or locking devices, receptacles shall be delivered without.

4.5.5 Traceability Information

Traceability information shall be marked in accordance with the requirements of ESCC Basic Specification No. 21700.

4.6 ELECTRICAL MEASUREMENTS

4.6.1 Electrical Measurements at Room Temperature
The parameters to be measured in respect of electrical characteristics are scheduled in Table 2. Unless otherwise specified, the measurements shall be performed at T_{amb} = +22±3 °C.

4.6.2 Electrical Measurements at High and Low Temperatures (Table 3)
Not applicable.

4.6.3 Circuits for Electrical Measurements (Figure 4)
Not applicable.

4.7 BURN-IN AND ELECTRICAL MEASUREMENTS (TABLES 4 AND 5)
Not applicable.

4.8 ENVIRONMENTAL AND ENDURANCE TESTS (CHARTS IV AND V OF ESCC GENERIC SPECIFICATION NO. 3401)

4.8.1 Measurements and Inspections on Completion of Environmental Tests
The parameters to be measured and inspections to be performed on completion of environmental testing shall be those specified in Table 6. Unless otherwise specified, the measurements shall be performed at T_{amb} = +22±3 °C.

4.8.2 Measurements and Inspections at Intermediate Points during Endurance Tests
Not applicable.

4.8.3 Measurements and Inspections on Completion of Endurance Tests
The parameters to be measured and inspections to be performed on completion of endurance testing are scheduled in Table 6. Unless otherwise specified, the measurements shall be performed at T_{amb} = +22±3 °C.

4.8.4 Conditions for Operating Life Test (Part of Endurance Testing)
Not applicable.

4.8.5 Electrical Circuits for Operating Life Test
Not applicable.

4.8.6 Conditions for High Temperature Storage Test (Part of Endurance Testing)
The requirements for the high temperature storage test are specified in Section 9 of ESCC Generic Specification No. 3401. The conditions for high temperature storage testing shall be the maximum storage temperature specified in Table 1(b) of this specification.

TABLE 2 – ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE

No.	Characteristics	Symbol	Spec. and/or Test Method	Test Condition	Limits		Unit
					Min.	Max.	
1	Insulation Resistance	Ri	ESCC No. 3401 Para. 9.1.1.1	Para. 9.1.1.1	10000	-	MΩ
2	Voltage Proof Leakage Current (Sea Level)	I_L	ESCC No. 3401 Para. 9.1.1.2	800Vrms		1	mA
3	Mated Shell Conductivity (Voltage Drop)	Vd	ESCC No. 3401 Para. 9.1.1.4	Para. 9.1.1.4	Not applicable		mV
4	Contact Resistance (Low Level Current)	Rcl	ESCC No. 3401 Para. 9.1.1.3	All	-	12	mΩ
5	Contact Resistance (Rated Current) (1)	Rcr	ESCC No. 3401 Para. 9.1.1.3	2A	-	12	mΩ

NOTES:

1. Contact Resistance at Rated Current is guaranteed but not tested during Final Production Tests (Chart II).

TABLES 3, 4 AND 5

Not applicable.

TABLE 6 – MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENTAL AND ENDURANCE TESTS

No.	ESCC Generic No. 3401		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests (1)	Test Method and Conditions	Identification	Conditions		Min.	Max.	
01	Seal Test	Para. 9.9	Not applicable			Not applicable		
02	Wiring	Para. 9.10				-	-	
03	Vibration	Para. 9.11	**Initial Measurements**					
			Coupling Screw(s) Unlocking Torque	-	-	Record Values		
			Final Measurements					
			Full Engagement	-				
			Coupling Screw(s) Unlocking Torque Drift	-	Δ	-25	+25	%
			Visual Examination	-	-	-	-	
04	Shock or Bump	Para. 9.12	Full Engagement	-				
			Visual Examination	-	-	-	-	
05	Climatic Sequence	Para. 9.13	**Dry Heat**					
			Insulation Resistance	Table 2 Item 1	Ri	1000	-	MΩ
			Low Air Pressure					
			Voltage Proof Leakage Curr.	Figure 1	I_L	ESCC 3401 Para. 9.13.5		
			Damp Heat	**Immediately after test**				
			Insulation Resistance	Table 2 Item 1	Ri	100	-	MΩ
			Final Measurements	**After 1-24 hrs Recovery**				
			External Visual Inspection	ESCC 3401 Para. 9.7	-	ESCC 3401 Para. 9.7		
			Insulation Resistance	Table 2 Item 1	Ri	Table 2 Item 1		
			Voltage Proof Leakage Curr.	Table 2 Item 2	I_L	Table 2 Item 2		
06	Plating Thickness	Para. 9.14	Thickness			Para. 4.4.3 of this spec.		
07	Joint Strength	Para. 9.15	ESCC 3401 Para. 9.15			Not applicable		
08	Rapid Change of Temperature	Para. 9.16	Visual Examination	-	-	-	-	
			Insulation Resistance	Table 2 Item 1	Ri	Table 2 Item 1		
			Voltage Proof Leakage Curr.	Table 2 Item 2	I_L	Table 2 Item 2		
09	Contact Retention (In Insert)	Para. 9.17 & Para. 4.3.4 of spec.	Contact Displacement	-	-	ESCC 3401 Para. 9.17		

No.	ESCC Generic No. 3401		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests (1)	Test Method and Conditions	Identification	Conditions		Min.	Max.	
10	Endurance	Para. 9.18	**Initial Measurements**					
			Mating/Unmating Forces	-	F	Para. 4.3.5 of this spec.		
			Low Level Contact Resist.	Table 2 Item 4	Rcl	Record Values		
			Mated Shell Conductivity	Table 2 Item 3	Vd	Not applicable		
			Final Measurements					
			Visual Examination	-	-	-	-	
			Mating/Unmating Forces	-	F	Para. 4.3.5 of this spec.		
			Low Level Contact Resistance Drift	Table 2 Item 4	ΔRcl	-	4	mΩ
			Mated Shell Conductivity	Table 2 Item 3	Vd	Table 2 Item 3		
			Insulation Resistance	Table 2 Item 1	Ri	Table 2 Item 1		
			Voltage Proof Leakage Curr.	Table 2 Item 2	I_L	Table 2 Item 2		
11	Permanence of Marking	Para. 9.19	As applicable		-	-	-	
12	Mating/Unmating Forces	Para. 9.20	Force		F	Para. 4.3.5 of this spec.		
13	High Temperature Storage	Para. 9.21	**Initial Measurements**					
			Low Level Contact Resist.	Table 2 Item 4	Rcl	Record Values		
			Mated Shell Conductivity	Table 2 Item 3	Vd	Not applicable		
			Final Measurements					
			Visual Examination	-	-	-	-	
			Mating/Unmating Forces	-	F	Para. 4.3.5 of this spec.		
			Low Level Contact Resistance Drift	Table 2 Item 4	ΔRcl	-	4	mΩ
			Rated Current Contact Resistance	Table 2 Item 5	Rcr	Table 2 Item 5		
			Mated Shell Conductivity	Table 2 Item 3	Vd	Not applicable		
			Insulation Resistance	Table 2 Item 1	Ri	Table 2 Item 1		
			Voltage Proof Leakage Curr.	Table 2 Item 2	I_L	Table 2 Item 2		
			Contact Retention (In Insert)	Para. 4.3.4 of this spec.	-	ESCC 3401 Para. 9.17		
14	Corrosion	Para. 9.22	Visual Examination	-	-	Not applicable		
15	Insert Retention (In Shell)	Para. 9.23 & Para. 4.3.6 of this spec.	Visual Examination	-	-	Para. 4.3.6 of this spec.		
16	Jackscrew Retention	Para. 9.24 & Para. 4.3.7 of this spec.	Visual Examination	-	-	Not applicable		
17	High Temperature Measurements	Para. 9.25	Insulation Resistance	Table 2 Item 1	Ri	500	-	MΩ

No.	ESCC Generic No. 3401		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests (1)	Test Method and Conditions	Identification	Conditions		Min.	Max.	
18	Overload Test	Para. 9.26	Internal Temperature		T	-	+100	°C
			Rated Current Contact Resistance	Table 2 Item 5	Rcr	Table 2 Item 5		
			Mated Shell Conductivity	Table 2 Item 3	Vd	Not applicable		
			Insulation Resistance	Table 2 Item 1	Ri	Table 2 Item 1		
			Voltage Proof Leakage Curr.	Table 2 Item 2	I_L	Table 2 Item 2		
19	Maintenance Aging	Para. 9.27	Visual Examination	-	-	-	-	
			Contact Retention	Para. 4.3.4 of this spec.		Not applicable		
			Contact Insertion and Withdrawal Forces	Para. 4.3.8 of this spec.		Not applicable		
20	Engage/Separation Forces	Para. 9.28 & Para. 4.3.9 of this spec.	Force		F	Para. 4.3.9 of this spec.		
21	Oversize Pin Exclusion	Para. 9.29 & Para. 4.3.10 of this spec.				ESCC 3401 Para. 9.29		
22	Probe Damage	Para. 9.30 & Para. 4.3.11 of this spec.	Contact Separation Force	Para. 4.3.9 of this spec.		Not applicable		
23	Solderability	Para. 9.31 & Para. 4.3.12 of this spec.				ESCC 3401 Para. 9.31		

NOTES:

1. The tests in this Table refer to either Chart IV or V and shall be used as applicable.