DOCUMENT CHANGE REQUEST

DCR number 665	Changes required for: General	Originator: S Jeffery
Date: 2012/01/27	Date sent: 2011/05/03	Organisation: ESTEC
Status: IMPLEMENTED		

Title:	Connectors Electrical Rectangular Microminiature, based on type MDM		
Number:	3401/029	Issue:	6

Other documents affected:

Page:

Paragraph:

Original wording:

Seee attachment.

Proposed wording:

Correction of a number of minor typographic errors (e.g. spelling) and correction of editorial and technical errors.

See attached mark-up of ESCC 3401/029 Issue 6 for details.

Justification:

- To correct editorial and typographic errors and thus improve the clarity, format and layout of the specification.

- Some dimensions require updating in order to ensure that the screw-locks will fit the connectors correctly.

Attachments:

3401029_issue_7_draft_b.pdf, null

Modifications:

N/A

Approval signature:

Date signed:

2012-01-27

European Space Components Coordination

Pages 1 to 39

CONNECTORS, ELECTRICAL, RECTANGULAR,

MICROMINIATURE,

BASED ON TYPE MDM

ESCC Detail Specification No. 3401/029

as applicable

Issue 6 7-Draft B	~~February 2010~~

Document Custodian: European Space Agency - see https://escies.org

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DCR No.	CHANGE DESCRIPTION
~~529~~, ~~560~~ tba	Specification upissued to incorporate editorial and technical 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 Electrical, Rectangular, Microminiature Connectors with Non-Removable Crimp-type Contacts and their associated insulated wires and uninsulated solid wires, based on type MDM.

It shall be read in conjunction with:

(a) ESCC Generic Specification No. 3401, Connectors, Electrical, Rectangular and Circular.
(b) ESCC Detail Specification No. 3401/032, Accessories for Connectors, Microminiature, 3401/029, 3401/077 and Connector Savers 3401/041.

the requirements of which are supplemented herein.

1.2 RANGE OF COMPONENTS

The different sizes of the basic type connectors specified herein, which are also covered by this specification, together with their mechanical characteristics, are scheduled in Table 1(a). The different sizes of associated insulated wires and uninsulated solid wires are given in Figure 2.

1.3 MAXIMUM RATINGS

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

1.4 PARAMETER DERATING INFORMATION

The derating information applicable to the contacts specified herein is shown in Figure 1.

1.5 PHYSICAL DIMENSIONS

The physical characteristics of the connectors, insulated wires and uninsulated solid wires specified herein are shown in Figure 2.

1.6 CONTACT ARRANGEMENTS

Contact arrangements are shown in Figure 3.

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, Circular and Rectangular.
(b) ESCC Detail Specification No. 3401/032, Accessories for Connectors, Microminiature, 3401/029, 3401/077 and Connector Savers 3401/041.
(c) ESCC Detail Specification No. 3901/002, Polyimide Insulated Wires and Cables, Low Frequency, 600V, -100 to +200°C.
(d) ESCC Detail Specification No. 3901/013, PTFE Insulated Wires and Cables, 600V, -100 to +200°C.
(e) QQ-W-343, ~~Wires, electrical, Uninsulated~~ Wire, Electrical, Copper (Uninsulated). (DTL)
(f) MIL-G-45204, Gold Plating, Electro-deposited.
(g) MIL-C-14550, Copper Plating, Electro-deposited.
(h) MIL-PRF-83513, Connectors Electrical, Rectangular, Microminiature, Polarised Shell, Gen[illegible] (al)

NOTES:

1. Between contacts, and contact and shell.

FIGURE 1 - PARAMETER DERATING INFORMATION

FIGURE 1(a) - WORKING VOLTAGE VERSUS ALTITUDE

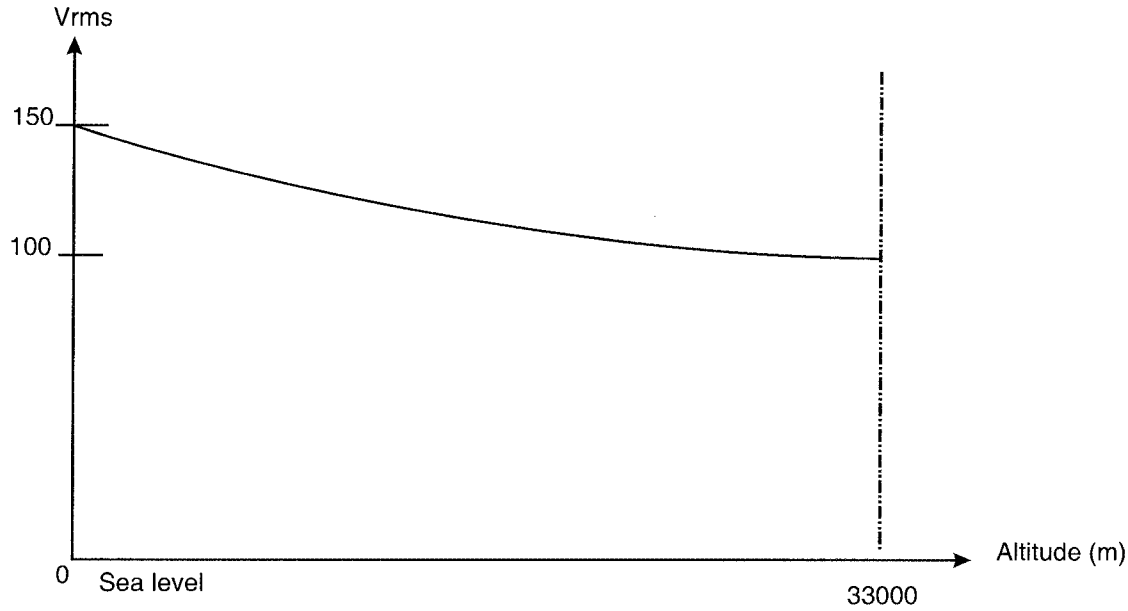
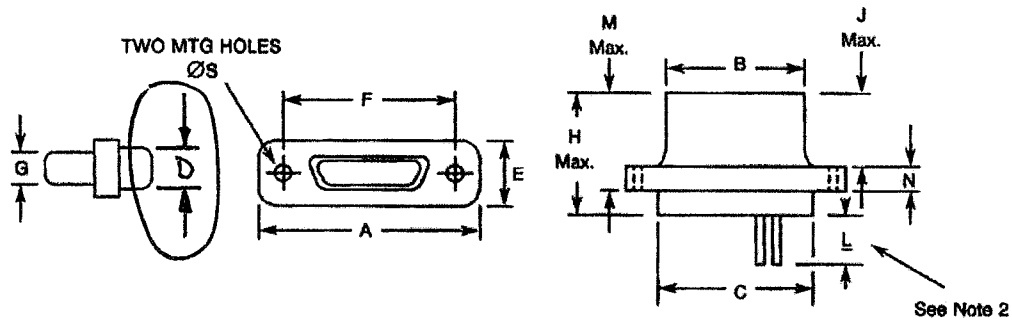


FIGURE 1(b) - MAXIMUM CURRENT VERSUS NUMBER OF CONTACTS

NUMBER OF CURRENT-CARRYING CONTACTS PER CONNECTOR	MAXIMUM CURRENT PER CONTACT (A)	
	WIRE SIZE	
	AWG26 AND UNINSULATED SOLID WIRE	AWG 28
2 - 4	2	1.4
5 - 14	1.8	1.2
15 and over	1.4	0.9

FIGURE 2 - PHYSICAL DIMENSIONS

Figure 2.1A Connector Shells - Plug Male Contacts

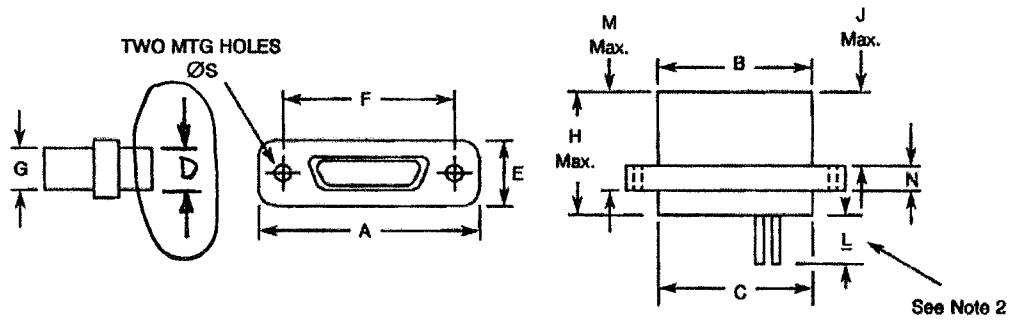


SHELL SIZE	A Max	B Max	C Max	D Max	E Max	F		G Max	H Max	J Max	M Max	N		ØS	
						Min	Max					Min	Max	Min	Max
9	19.94	8.46	10.16	6.86	7.82	14.22	14.48	4.69	10.57	4.72	7.26	2.23	2.49	2.23	2.39
15	23.75	12.27	13.97	6.86	7.82	18.03	18.29	4.69	10.57	4.72	7.26	2.23	2.49	2.23	2.39
21	27.56	16.08	17.78	6.86	7.82	21.84	22.1	4.69	10.57	4.72	7.26	2.23	2.49	2.23	2.39
25	30.1	18.62	20.32	6.86	7.82	24.38	24.64	4.69	10.57	4.72	7.26	2.23	2.49	2.23	2.39
31	33.91	22.43	24.13	6.86	7.82	28.19	28.45	4.69	10.57	4.72	7.26	2.23	2.49	2.23	2.39
37	37.72	26.24	27.94	6.86	7.82	32	32.26	4.69	10.57	4.72	7.26	2.23	2.49	2.23	2.39
51	36.45	24.97	26.67	7.87	8.92	30.73	30.99	5.78	10.57	4.72	7.26	2.23	2.49	2.23	2.39

NOTES:

1. All dimensions are in millimetres.
2. For minimum length of L refer to Para. 4.5.3.3 of this specification.

Figure 2.1B Connector Shells - Receptacle Female Contacts



SHEL L SIZE	A Max	B Max	C Max	D Max	E Max	F		G Max	H Max	J Max	M Max	N		ØS	
						Min	Max					Min	Max	Min	Max
9	19.94	10.16	10.16	6.86	7.82	14.22	14.48	6.38	10.9	5.05	7.59	2.23	2.49	2.23	2.39
15	23.75	13.97	13.97	6.86	7.82	18.03	18.29	6.38	10.9	5.05	7.59	2.23	2.49	2.23	2.39
21	27.56	17.78	17.78	6.86	7.82	21.84	22.1	6.38	10.9	5.05	7.59	2.23	2.49	2.23	2.39
25	30.1	20.32	20.32	6.86	7.82	24.38	24.64	6.38	10.9	5.05	7.59	2.23	2.49	2.23	2.39
31	33.91	24.13	24.13	6.86	7.82	28.19	28.45	6.38	10.9	5.05	7.59	2.23	2.49	2.23	2.39
37	37.72	27.94	27.94	6.86	7.82	32	32.26	6.38	10.9	5.05	7.59	2.23	2.49	2.23	2.39
51	36.45	26.67	26.67	7.87	8.92	30.73	30.99	7.47	10.9	5.05	7.59	2.23	2.49	2.23	2.39

NOTES:

1. All dimensions are in millimetres.
2. For minimum length of L refer to Para. 4.5.3.3 of this specification.

Min.

Shell Size	K	K1		M		N		P		Q		R	S		T		U
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	~~Max.~~	Min.	Max.	Min.	Max.	Max.
9	2.54	3.56	4.06	9	9.2	5.15	5.45	2.79	3.55	2	2.1	4.[illegible]	0.2	0.4	2.23	2.49	11.56
15	2.54	3.56	4.06	9	9.2	5.15	5.45	2.79	3.55	2	2.1	4.[illegible]	0.2	0.4	2.23	2.49	11.56
21	2.54	3.56	4.06	9	9.2	5.15	5.45	2.79	3.55	2	2.1	4.[illegible]	0.2	0.4	2.23	2.49	11.56
25	2.54	3.56	4.06	9	9.2	5.15	5.45	2.79	3.55	2	2.1	4.[illegible]	0.2	0.4	2.23	2.49	11.56
31	2.54	3.56	4.06	9	9.2	5.15	5.45	2.79	3.55	2	2.1	4.[illegible]	0.2	0.4	2.23	2.49	11.56
37	2.54	3.56	4.06	9	9.2	5.15	5.45	2.79	3.55	2	2.1	4.[illegible]	0.2	0.4	2.23	2.49	11.56

B

NOTES:

1. All dimensions are in millimetres.
2. For ØA refer to Para. 4.5.3.3 of this specification.
3. Øg: 2-56-UNC-2B.
4. Maximum torque 0.44 Nm.

Min.

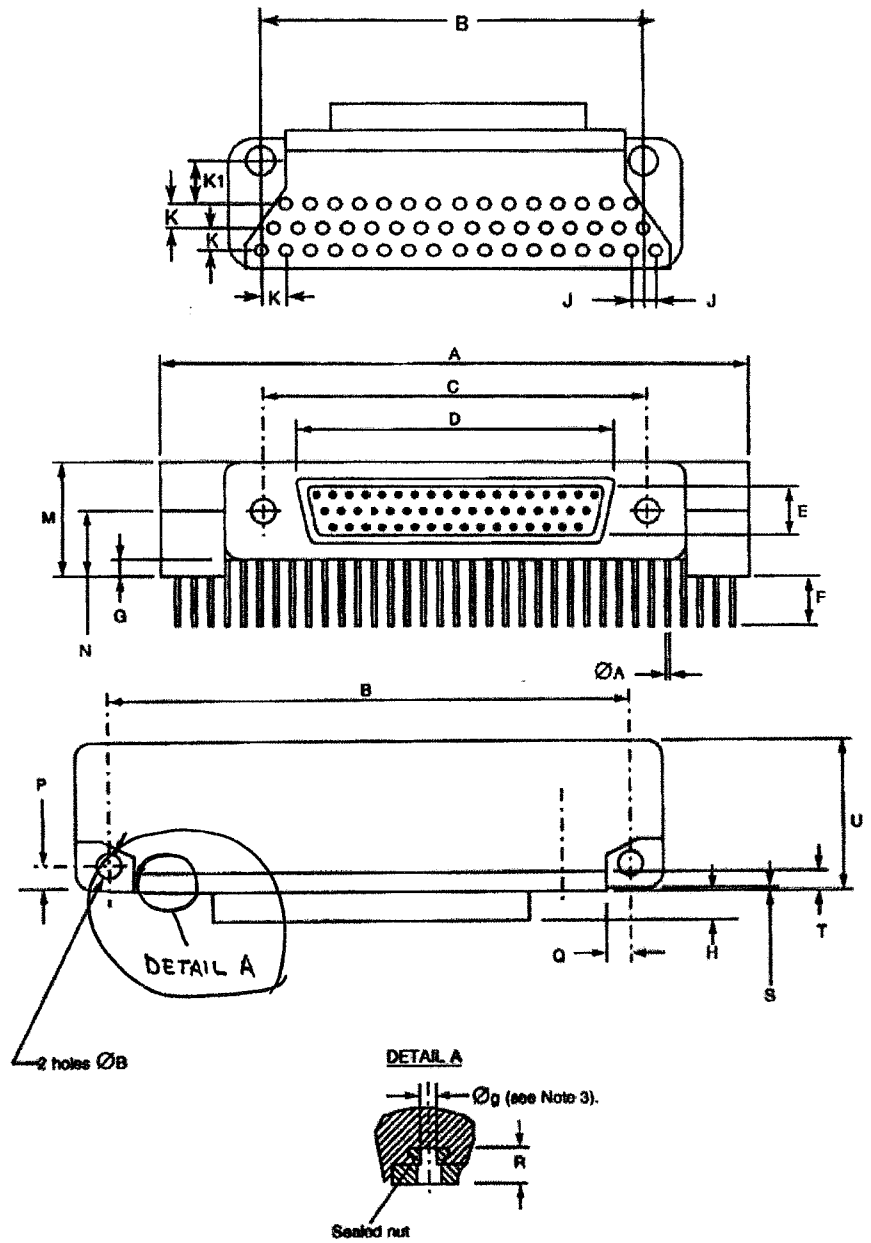
Shell Size	K	K1		M		N		P		Q		R	S		T		U
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	~~Max~~	Min.	Max.	Min.	Max.	Max.
9	2.54	3.56	4.06	9	9.2	5.15	5.45	2.79	3.55	2	2.1	4.6	0.2	0.4	2.23	2.49	11.56
15	2.54	3.56	4.06	9	9.2	5.15	5.45	2.79	3.55	2	2.1	4.6	0.2	0.4	2.23	2.49	11.56
21	2.54	3.56	4.06	9	9.2	5.15	5.45	2.79	3.55	2	2.1	4.6	0.2	0.4	2.23	2.49	11.56
25	2.54	3.56	4.06	9	9.2	5.15	5.45	2.79	3.55	2	2.1	4.6	0.2	0.4	2.23	2.49	11.56
31	2.54	3.56	4.06	9	9.2	5.15	5.45	2.79	3.55	2	2.1	4.6	0.2	0.4	2.23	2.49	11.56
37	2.54	3.56	4.06	9	9.2	5.15	5.45	2.79	3.55	2	2.1	4.6	0.2	0.4	2.23	2.49	11.56

8

NOTES:

1. All dimensions are in millimetres.
2. For ØA refer to Para. 4.5.3.3 of this specification.
3. Øg: 2-56-UNC-2B.
4. Maximum torque 0.44 Nm.

FIGURE 2.2C - CONNECTORS TYPE - FR136
PLUG MALE CONTACTS



Shell Size	A	B		ØB (4)		C		D	E	F		G		H	J
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Max.	Max.	Min.	Max.	Min.	Max.	Max.	Typ.
51	47.63	40.46	40.82	2.31	2.59	30.73	30.99	24.97	5.78	4.15	4.85	1.3	1.7	4.72	1.27

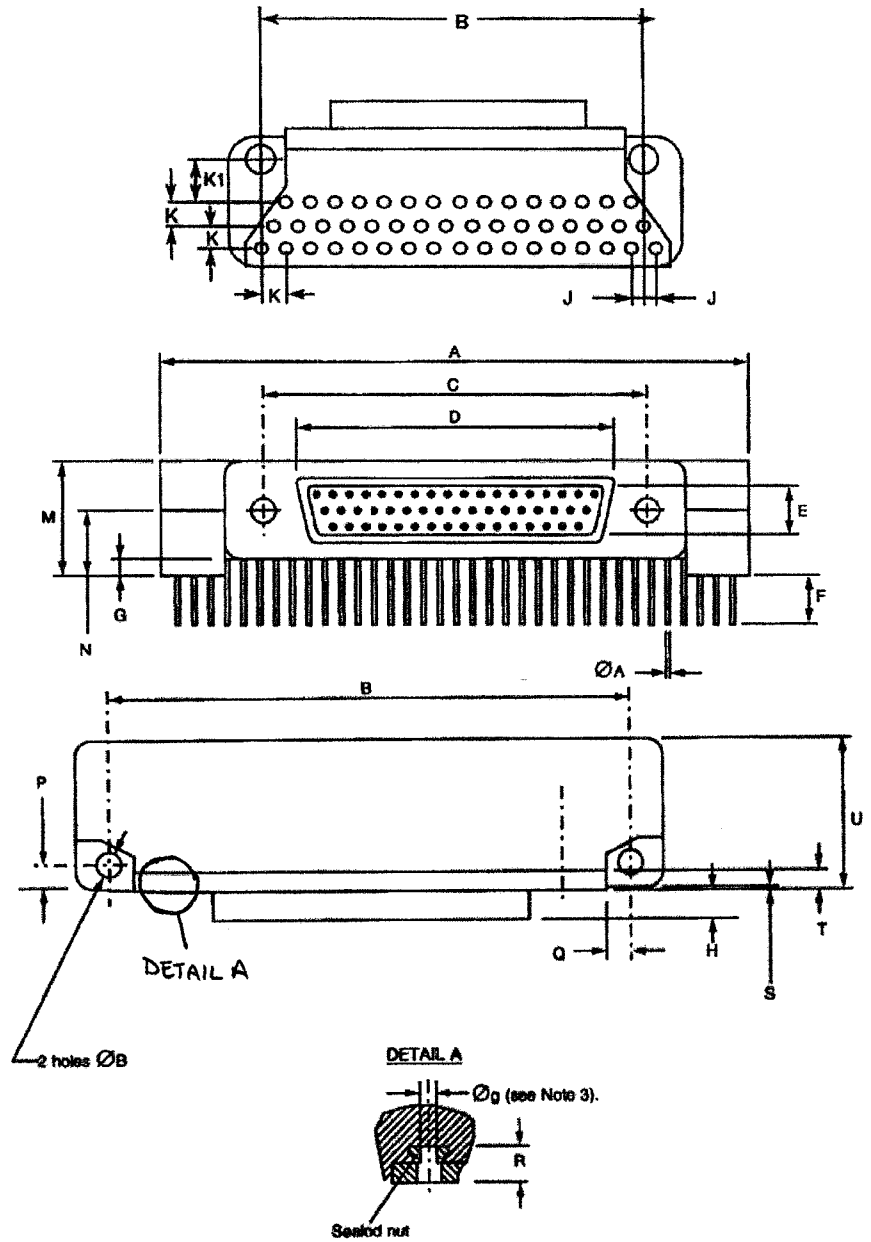
Shell Size	K	K1		M		N		P		Q		R	S		T		U
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Max.	Min.	Max.	Min.	Max.	Max.
51	2.54	3.56	4.06	10.1	10.4	5.81	6.11	2.79	3.55	2.05	2.15	4.8	0.2	0.4	2.23	2.49	14.35

Min. 8

NOTES:

1. All dimensions are in millimetres.
2. For ØA refer to Para. 4.5.3.3 of this specification.
3. Øg: 2-56-UNC-2B.
4. Maximum torque 0.44 Nm.

FIGURE 2.2D - CONNECTORS TYPE - FR136
RECEPTACLE FEMALE CONTACTS



Shell Size	A	B		ØB (4)		C		D	E	F		G		H	J
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Max.	Max.	Min.	Max.	Min.	Max.	Max.	Typ.
51	47.63	40.46	40.82	2.31	2.59	30.73	30.99	26.67	7.47	4.15	4.85	1.3	1.7	5.05	1.27

Min.

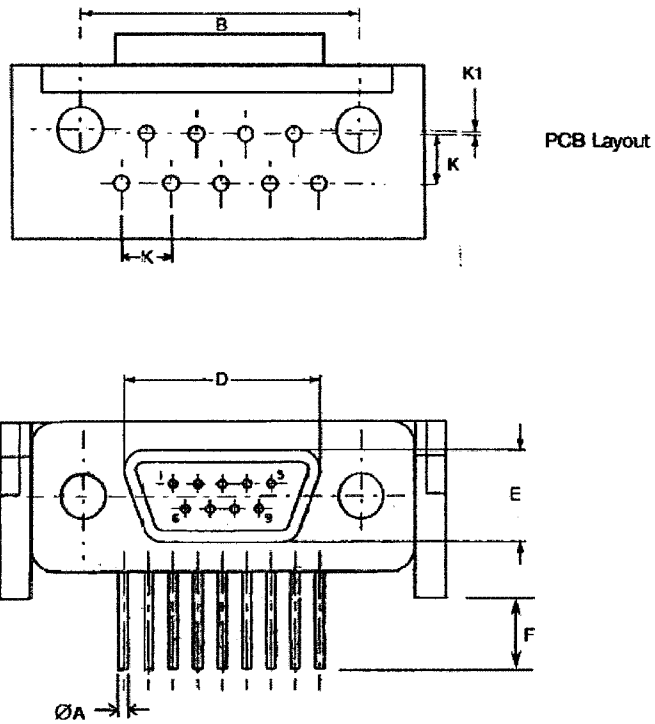
Shell Size	K	K1		M		N		P		Q		R	S		T		U
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Max.	Min.	Max.	Min.	Max.	Max.
51	2.54	3.56	4.06	10.1	10.4	5.81	6.11	2.79	3.55	2.05	2.15	4.5	0.2	0.4	2.23	2.49	14.35

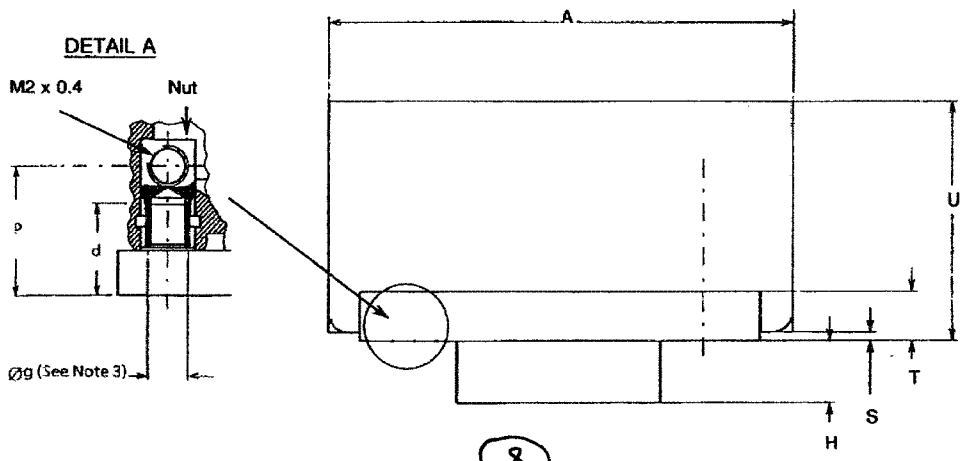
8

NOTES:

1. All dimensions are in millimetres.
2. For ØA refer to Para. 4.5.3.3 of this specification.
3. Øg: 2-56-UNC-2B.
4. Maximum torque 0.44 Nm.

FIGURE 2.2E - CONNECTORS TYPE - FR136A
PLUG MALE CONTACTS





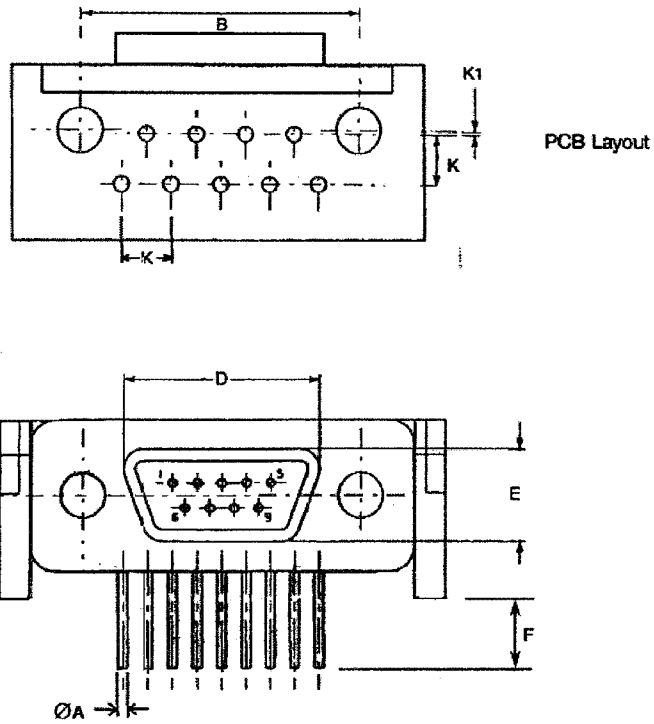
Shell Size	A	B		d	D	E	F		H	K	K1
	Max.	Min.	Max.	Min.	Max.	Max.	Min.	Max.	Max.	Max.	Typ.
9	23.12	14.22	14.48	4.8	8.46	4.69	3.3	3.7	4.72	2.54	0.2

Shell Size	M		N		P		S		T		U
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Max.
9	9	9.2	5.15	5.45	6.48	7.24	0.2	0.4	2.23	2.49	11.5

NOTES:

1. All dimensions are in millimetres.
2. For ØA refer to Para. 4.5.3.3 of this specification.
3. Øg: 2-56-UNC-2B.

FIGURE 2.2F - CONNECTORS TYPE - FR136A
RECEPTACLE FEMALE CONTACTS



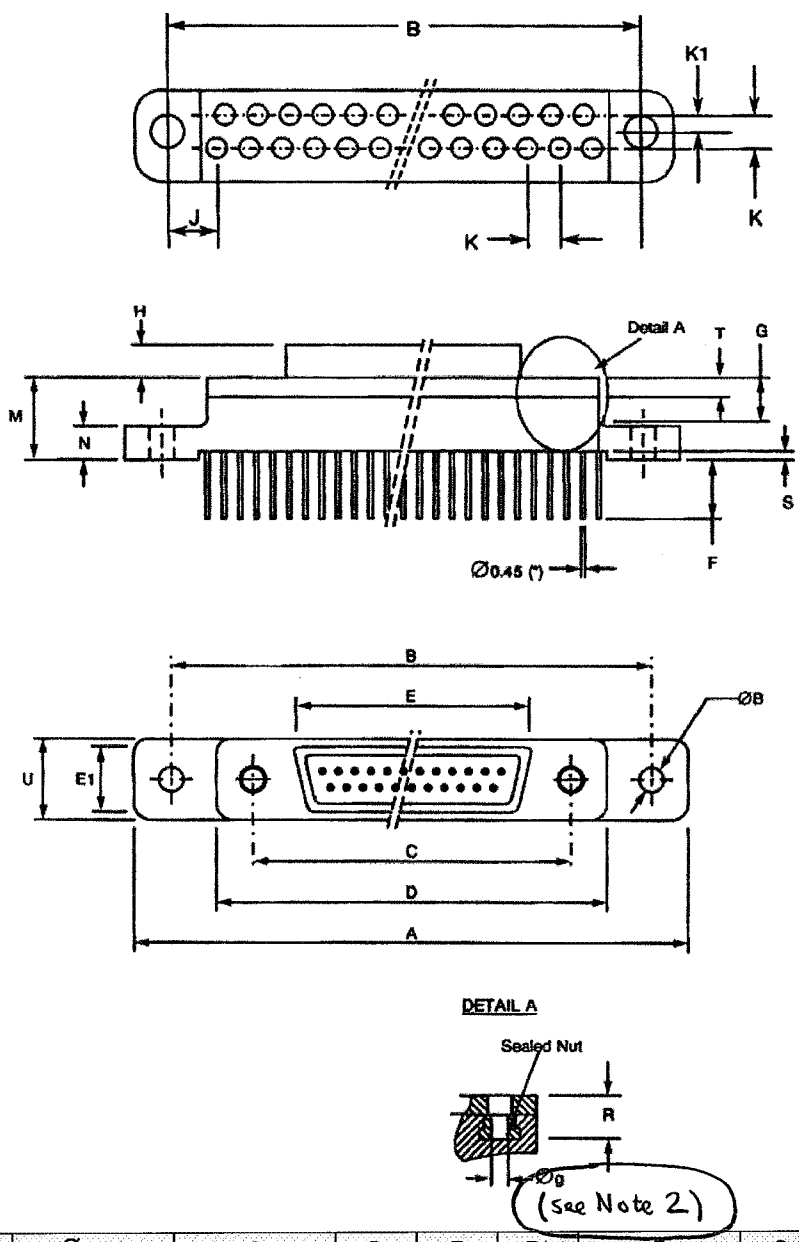
Shell Size	A	B		d	D	E	F		H	K	K1
	Max.	Min.	Max.	Min.	Max.	Max.	Min.	Max.	Max.	Max.	Typ.
9	23.12	14.22	14.48	4.8	10.16	6.38	3.3	3.7	5.05	2.54	0.2

Shell Size	M		N		P		S		T		U
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Max.
9	9	9.2	5.15	5.45	6.48	7.24	0.2	0.4	2.23	2.49	11.5

NOTES:

1. All dimensions are in millimetres.
2. For ØA refer to Para. 4.5.3.3 of this specification.
3. Øg: 2-56-UNC-2B.

FIGURE 2.2G - CONNECTORS TYPE - FR139
PLUG MALE CONTACTS



Shell Size	A	B		ØB (3)		C		D	E	E1	F		G	H	J
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Max.	Max.	Max.	Min.	Max.	Min.	Max.	Typ.
9	35.31	29.03	29.39	2.31	2.59	14.22	14.48	19.94	8.46	4.69	4.15	4.85	4.6	4.72	9.53
15	35.31	29.03	29.39	2.31	2.59	18.03	18.29	23.75	12.27	4.69	4.15	4.85	4.6	4.72	5.72
21	42.93	36.65	37.01	2.31	2.59	21.84	22.1	27.56	16.08	4.69	4.15	4.85	4.6	4.72	5.72

Shell Size	A	B		ØB (3)		C		D	E	E1	F		G	H	J
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Max.	Max.	Max.	Min.	Max.	Min.	Max.	Typ.
25	44.2	37.92	38.28	2.31	2.59	24.38	24.64	30.1	18.62	4.69	4.15	4.85	4.6	4.72	3.81
31	51.82	45.54	45.9	2.31	2.59	28.19	28.45	33.91	22.43	4.69	4.15	4.85	4.6	4.72	3.81
37	59.44	53.16	53.52	2.31	2.59	32	32.26	37.72	26.64	4.69	4.15	4.85	4.6	4.72	3.81

Shell Size	K	K1	M		N		R	S		T		U
	Typ.	Typ.	Min.	Max.	Min.	Max.	Max.	Min.	Max.	Min.	Max.	Max.
9	2.54	1.27	8.62	9.02	4	4.2	4.6	0.9	1.1	2.23	2.49	7.82
15	2.54	1.27	8.62	9.02	4	4.2	4.6	0.9	1.1	2.23	2.49	7.82
21	2.54	1.27	8.62	9.02	4	4.2	4.6	0.9	1.1	2.23	2.49	7.82
25	2.54	1.27	8.62	9.02	4	4.2	4.6	0.9	1.1	2.23	2.49	7.82
31	2.54	1.27	8.62	9.02	4	4.2	4.6	0.9	1.1	2.23	2.49	7.82
37	2.54	1.27	8.62	9.02	4	4.2	4.6	0.9	1.1	2.23	2.49	7.82

NOTES:

1. All dimensions are in millimetres.
2. Øg: 2-56-UNC-2B.
3. Maximum torque 0.44 Nm.

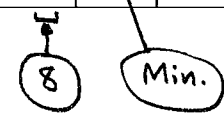
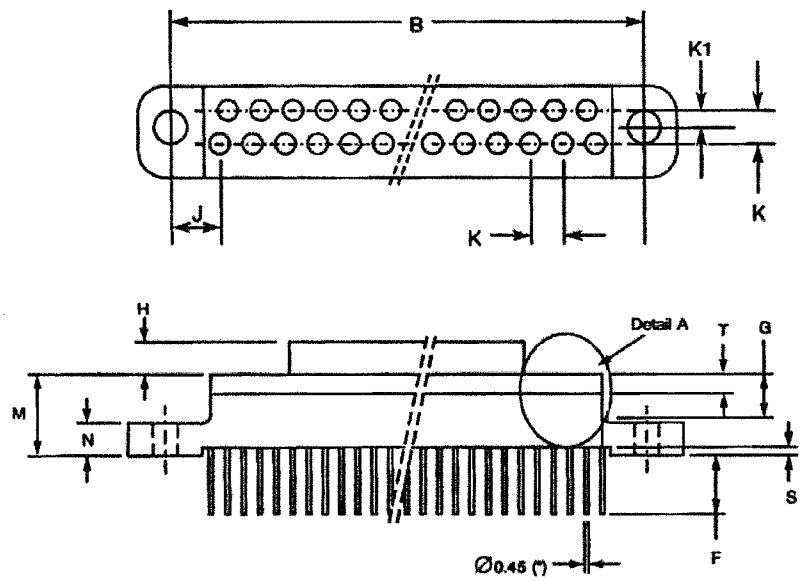
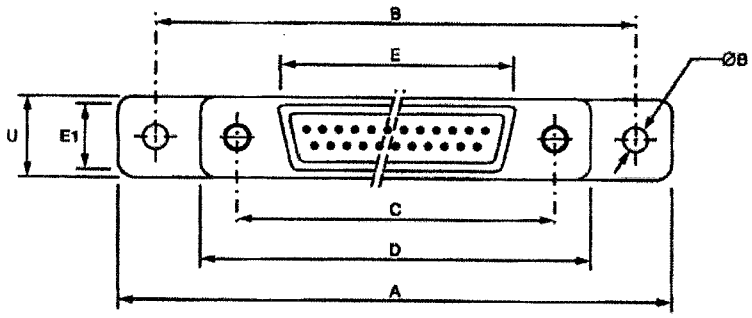
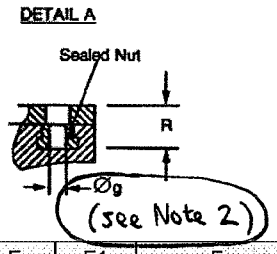


FIGURE 2.2H - CONNECTORS TYPE - FR139
RECEPTACLE FEMALE CONTACTS







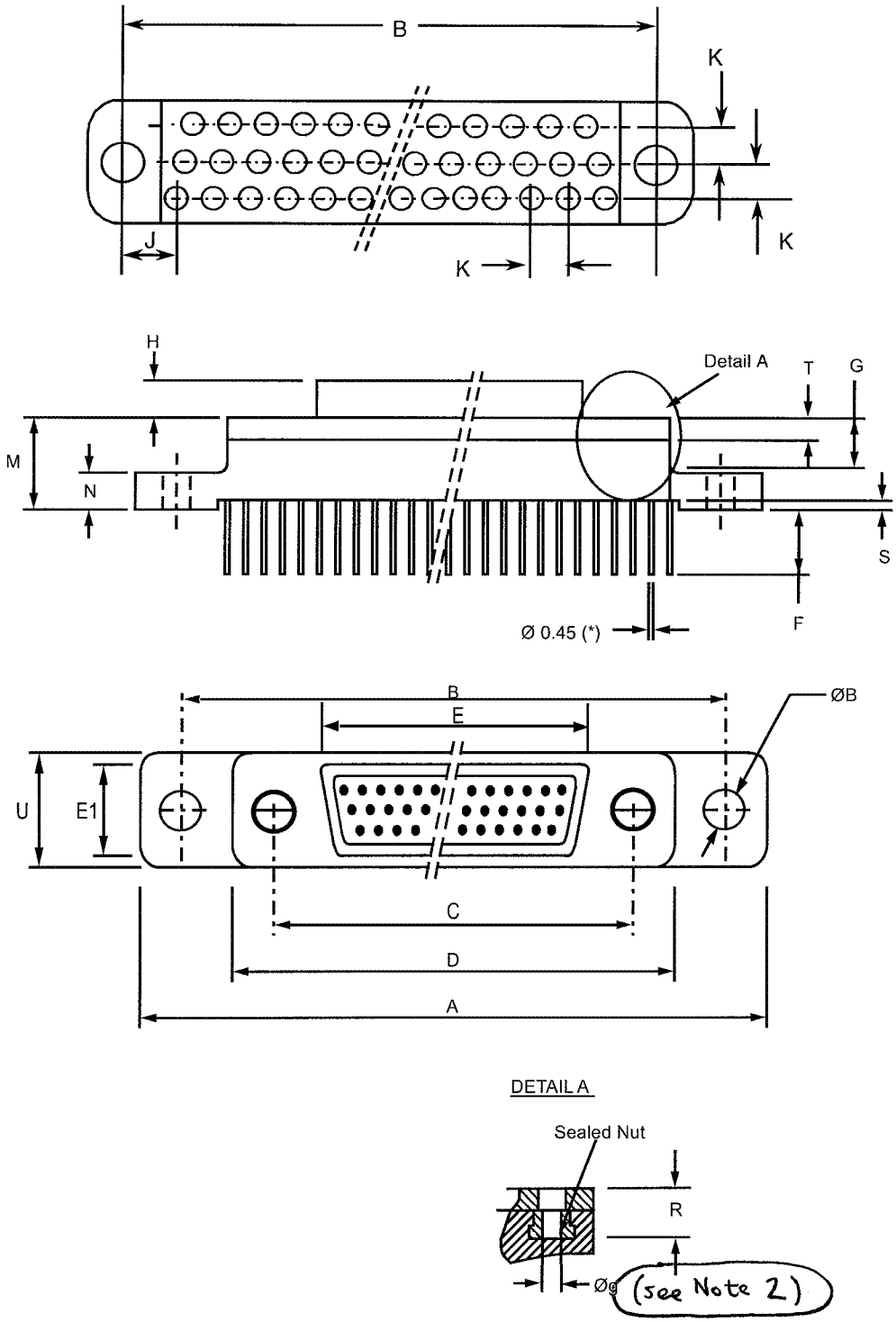
Shell Size	A	B		ØB (3)		C		D	E	E1	F		G	H	J
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Max.	Max.	Max.	Min.	Max.	Min.	Max.	Typ.
9	35.31	29.03	29.39	2.31	2.59	14.22	14.48	19.94	10.16	6.38	4.15	4.85	4.6	5.05	9.53
15	35.31	29.03	29.39	2.31	2.59	18.03	18.29	23.35	13.97	6.38	4.15	4.85	4.6	5.05	5.72
21	42.93	36.65	37.01	2.31	2.59	21.84	22.1	27.56	17.78	6.38	4.15	4.85	4.6	5.05	5.72
25	44.2	37.92	38.28	2.31	2.59	24.38	24.64	30.1	20.32	6.38	4.15	4.85	4.6	5.05	3.81
31	51.82	45.54	45.9	2.31	2.59	28.19	28.45	33.91	24.13	6.38	4.15	4.85	4.6	5.05	3.81
37	59.44	53.16	53.52	2.31	2.59	32	32.26	37.72	27.94	6.38	4.15	4.85	4.6	5.05	3.81

Shell Size	K	K1	M		N		R	S		T		U
	Typ.	Typ.	Min.	Max.	Min.	Max.	~~Max.~~	Min.	Max.	Min.	Max.	Max.
9	2.54	1.27	8.62	9.02	4	4.2	4.6	0.9	1.1	2.23	2.49	7.82
15	2.54	1.27	8.62	9.02	4	4.2	4.6	0.9	1.1	2.23	2.49	7.82
21	2.54	1.27	8.62	9.02	4	4.2	4.6	0.9	1.1	2.23	2.49	7.82
25	2.54	1.27	8.62	9.02	4	4.2	4.6	0.9	1.1	2.23	2.49	7.82
31	2.54	1.27	8.62	9.02	4	4.2	4.6	0.9	1.1	2.23	2.49	7.82
37	2.54	1.27	8.62	9.02	4	4.2	4.6	0.9	1.1	2.23	2.49	7.82

NOTES:

1. All dimensions are in millimetres.
2. Øg: 2-56-UNC-2B.
3. Maximum torque 0.44 Nm.

FIGURE 2.2I - CONNECTORS TYPE - FR139
PLUG MALE CONTACTS



DETAIL A

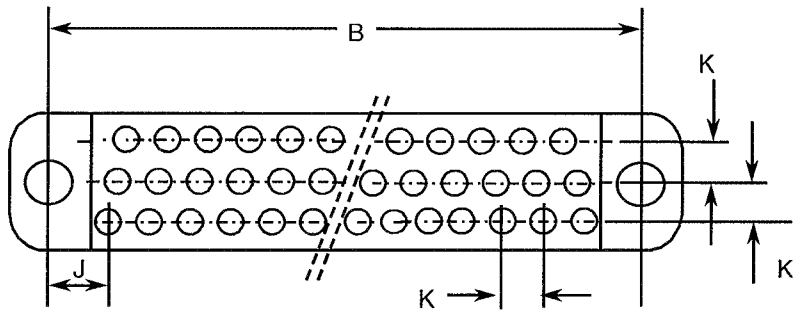
Shell Size	A	B		ØB (3)		C		D	E	E1	F		G	H	J
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Max.	Max.	Max.	Min.	Max.	Min.	Max.	Typ.
51	59.44	53.16	53.52	2.31	2.59	30.73	30.99	36.5	24.97	5.78	4.15	4.85	4	4.72	3.81

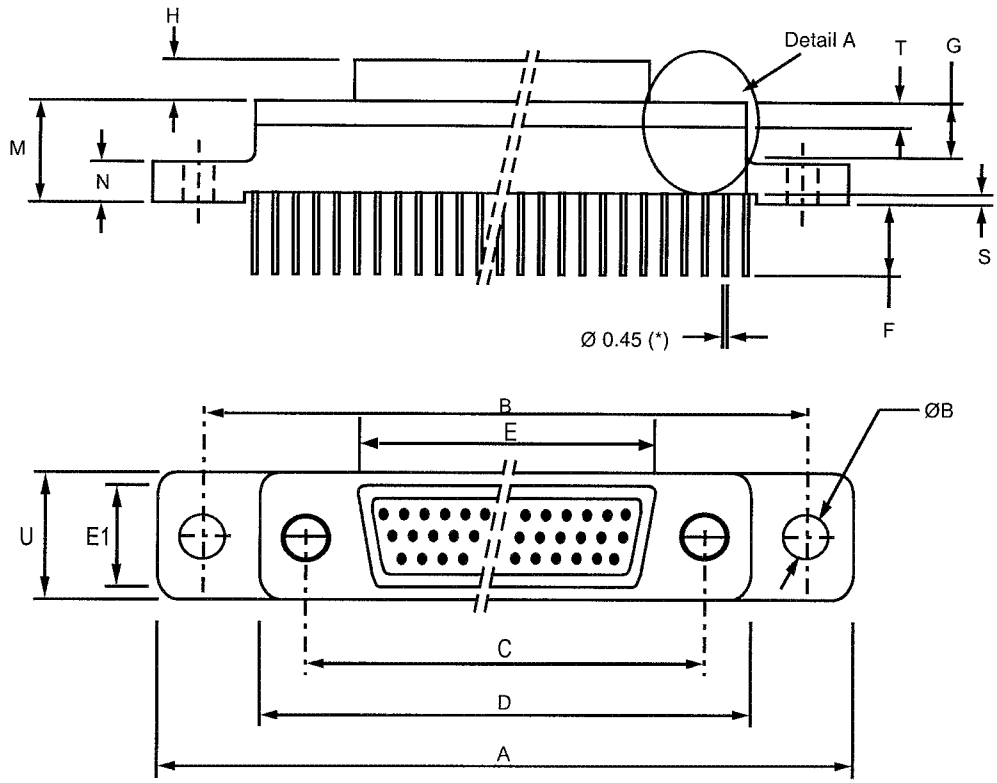
Min.

Shell Size	K	M		N		R	S		T		U
	Typ.	Min.	Max.	Min.	Max.	~~Max.~~	Min.	Max.	Min.	Max.	Max.
51	2.54	8.62	9.02	4	4.2	4.8	0.9	1.1	2.23	2.49	9

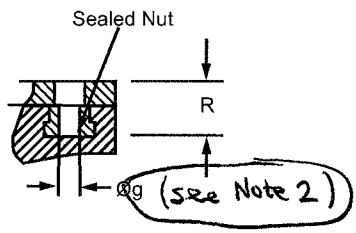
NOTES:
1. All dimensions are in millimetres.
2. Øg: 2-56-UNC-2B.
3. Maximum torque 0.44 Nm.

FIGURE 2.2J - CONNECTORS TYPE - FR139
RECEPTACLE FEMALE CONTACTS





DETAIL A



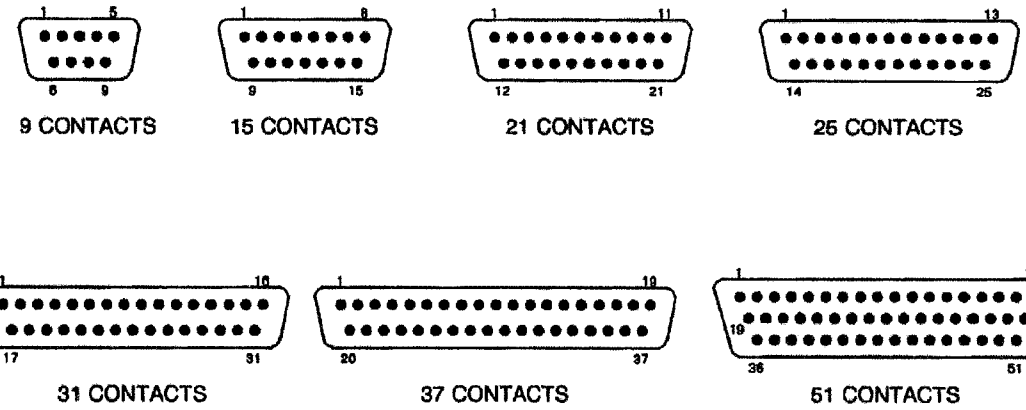
Shell Size	A	B		ØB (3)		C		D	E	E1	F		G	H	J
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Max.	Max.	Max.	Min.	Max.	Min.	Max.	Typ.
51	59.44	53.16	53.52	2.31	2.59	30.73	30.99	36.5	26.67	7.47	4.15	4.85	4	5.05	3.81

Shell Size	K	M		N		R	S		T		U
	Typ.	Min.	Max.	Min.	Max.	~~Max.~~ Min.	Min.	Max.	Min.	Max.	Max.
51	2.54	8.62	9.02	4	4.2	4.8	0.9	1.1	2.23	2.49	9

NOTES:

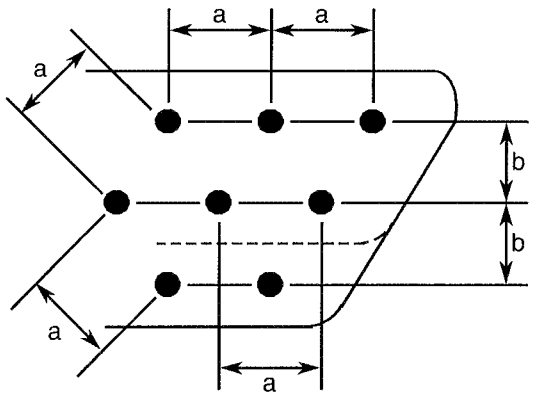
1. All dimensions are in millimetres.
2. Øg: 2-56-UNC-2B.
3. Maximum torque 0.44 Nm.

FIGURE 3 - CONTACT ARRANGEMENTS
FRONT VIEW OF MALE INSERT - USE MIRROR VIEW FOR FEMALE INSERT



NOTES:
1. Only the outside contact cavities on each row are identified in the drawing, the remainder follow sequentially. Contact numbers are shown outside the insert for readability.

Contact Centres



NOTES:
1. a = Distance between contact centres: 1.27mm (typical).
2. b = Distance between rows: 1.09mm (typical).

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

Para. 9.15, Joint strength: the contacts shall be crimped to insulated stranded wire AWG26 and AWG28, and to uninsulated solid wire AWG25. The value of failure shall be recorded together with the information as to whether the failure was 'pull-out', 'break in crimp' or 'break in wire'. the minimum tensile strength shall be as follows:

Wire	Male and Female Contacts		
	AWG26	AWG28	AWG25 - Solid Uninsulated
Tensile Strength (N)	22	13	22

4.2.2 Deviations from Final Production Tests (Chart II)

(a) Para. 9.4, Contact Capability: this test shall be performed on the male contacts. For details see Para. 4.3.3 of this specification.
(b) Para. 9.5, Magnetism Level: Not applicable.

4.2.3 Deviations from Burn-in and Electrical Measurements (Chart III)

None (Chart III is not applicable).

4.2.4 Deviations from Qualification Tests (Chart IV)

(a) Para. 9.15, Joint Strength: Not applicable.
(b) Para. 9.17, Contact Retention (in insert): Not applicable with male contact.
(c) Para. 9.27, Maintenance Ageing: Not applicable.
(d) Para. 9.29, Oversize Pin Exclusion: Not applicable.
(e) Para. 9.30, Probe Damage: Not applicable.
(f) Para. 9.31, Solderability: Not applicable.

4.2.5 Deviations from Lot Acceptance Tests (Chart V)

(a) Para. 9.15, Joint Strength: Not applicable.
(b) Para. 9.17, Contact Retention (in insert): Not applicable with male contact.
(c) Para. 9.27, Maintenance Ageing: Not applicable.
(d) Para. 9.29, Oversize Pin Exclusion: 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 underlined dimensions shall be checked during procurement.

4.3.11 Probe Damage

Not applicable.

4.3.12 Solderability

Not applicable.

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 components 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. The plating shall be 25.4µm minimum of electroless nickel (Variant 01) or with a minimum thickness of 2.54µm of gold over a layer of electroless nickel underlay (Variant 02).

4.4.2 Inserts

Inserts shall be made of glass fibre-filled ~~diallyphthalate~~ diallylphthalate resin or suitable thermoplastic material.

4.4.3 Contacts

4.4.3.1 Female Contacts

The contact body shall be made of copper alloy with an underplate of 1µm minimum of copper to MIL-C-14550, gold plated with 1.27µm minimum of gold, Type 2, Grade C of MIL-G-45204. Measurement of thickness shall be performed at a distance of 1.5mm from the engagement end. DTL

4.4.3.2 Male Contacts

The contact body and the bundle shall be made of copper alloy with an underplate of 1µm minimum of copper to MIL-C-14550, gold plated with 1.27µm minimum of gold, Type 2, Grade C of MIL-G-45204. Measurement of thickness shall be performed at a distance of 1.5mm from the engagement end. DTL

4.4.4 Seals Interfacial

Interfacial seals shall be made of silicon base rubber.

4.4.5 Insulated Wires

Wire materials and finishes shall be in accordance with the requirements specified in Para. 4.4 of ESCC Detail Specifications No. 3901/002 and 3901/013.

4.4.6 Uninsulated Solid Wire

Uninsulated solid wires shall be made of copper alloy in accordance with Type S as specified in QQ-W-343. They shall be gold-plated in accordance with Class ØØ, Grade C or D, as specified in MIL-G-45204. DTL

4.4.7 Rear Potting

Rear potting shall be made of epoxy resin. For connectors Type FR136, Type FR136A and Type FR139, the rear container shall be made from glass-fibre filled ~~diallyphthalate~~ diallylphthalate resin.

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 measurement shall be performed at T_{amb} = +22 ±3°C.

4.6.2 Electrical Measurements at High and Low Temperatures

Not applicable.

4.6.3 Circuits for Electrical Measurements

Not applicable.

4.7 BURN-IN AND ELECTRICAL MEASUREMENTS (TABLES 4 AND 5)

Not applicable.

Table 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE

No.	Characteristic	Symbol	ESCC 3401 Test Method	Test Condition	Limits		Unit
					Min	Max	
1	Insulation Resistance	R_i	Para. 9.1.1.1	Para. 9.1.1.1	5000	-	MΩ
2	Voltage Proof Leakage Current	I_L	Para. 9.1.1.2	600Vrms	-	2	mA
3	Mated Shell Conductivity (Voltage Drop) Note 1	V_D	Para. 9.1.1.4	Para. 9.1.1.4	Not applicable		mV
4	Contact Resistance (Low Level Current)	R_{cl} max.	Para. 9.1.1.3	Para. 9.1.1.3	-	6	mΩ
5	Contact Resistance (Rated Current)	R_{cr} max.	Para. 9.1.1.3	Table 1(b)	-	5	mΩ

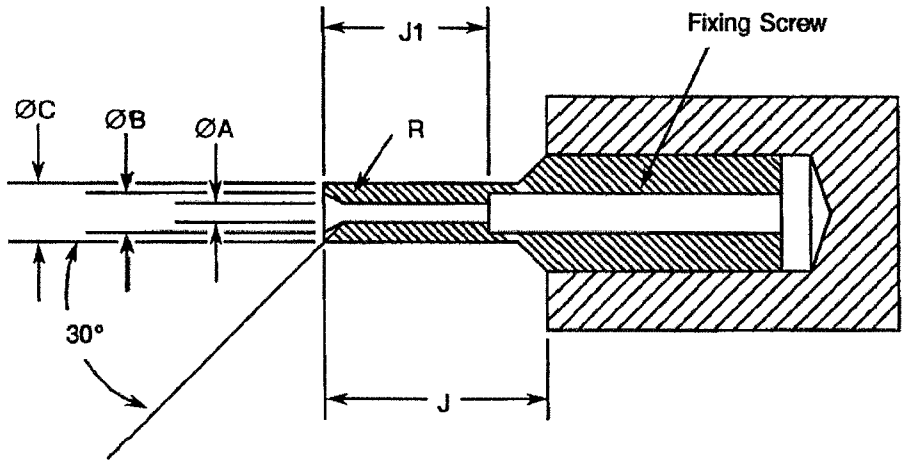
NOTES:

1. Applicable to mated connectors with grounding option.

TABLES 3, 4 AND 5

Not applicable.

FIGURE 4 - GAUGE FIXTURE



MAXIMUM GAUGE

Symbol	Weight (g) 170		Remarks
	Min.	Max.	
ØA	0.559	0.564	Note 2
ØB	0.749	0.775	-
ØC	0.813	0.825	-
J	4	-	-
J1	3.13	3.23	-
R	0.381	0.483	Note 1

MINIMUM GAUGE

Symbol	Weight (g) 14		Remarks
	Min.	Max.	
ØA	0.582	0.587	Note 2
ØB	0.749	0.775	-
ØC	0.813	0.825	-
J	4	-	-
J1	3.13	3.23	-
R	0.381	0.483	Note 1

NOTES:

1. Radius R, must be tangent to entry chamfer and ØA.
2. ØA and entry chamfer shall have a surface roughness of 3.2µm (roughness grade N8).

No.	ESCC Generic Spec. No. 3401		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests Note 1	Test Method and Conditions	Identification	Conditions		Min	Max	
			Damp Heat Insulation Resistance	Immediately after test Table 2, Item 1	R_i	100	-	MΩ
			Final Measurements External Visual Inspection	After 1-24 hrs Recovery ESCC 3401 Para. 9.7			ESCC 3401 Para. 9.7	
			Insulation Resistance Voltage Proof Leakage Current	Table 2, Item 1 Table 2, Item 2	R_i I_L	Table 2, Item 1 Table 2, Item 2		MΩ mA
06	Plating Thickness	Para. 9.14	Thickness	-	-	Para. 4.4.3 of this spec.		
07	Joint Strength (N/A to solder contacts)	Para. 9.15	ESCC 3401 Para. 9.15	-	-	Not applicable		-
08	Rapid Change of Temperature	Para. 9.16	Visual Examination	-	-	-	-	-
			Insulation Resistance Voltage Proof Leakage Current	Table 2, Item 1 Table 2, Item 2	R_i I_L	Table 2, Item 1 Table 2, Item 2		MΩ mA
09	Contact Retention (in Insert)	Para. 9.17 & Para. 4.3.4 of this spec.	Contact Displacement	-	-	ESCC 3401 Para. 9.17		
10	Endurance	Para. 9.18	**Initial Measurements** Mating/Unmating Forces		F	Para. 4.3.5 of this spec.		N
			Low Level Contact Resistance	Table 2, Item 4	R_{cl}	Record Values		mΩ
			Mated Shell Conductivity	Table 2, Item 3	V_D	Not applicable		mV
			Final Measurements Visual Examination	-	-	-	-	
			Mating/Unmating Forces		F	Para. 4.3.5 of this spec		N
			Low Level Contact Resistance Drift	Table 2, Item 4	ΔR_{cl}	-	3	mΩ
			Rated Current Contact Resistance	Table 2, Item 5	R_{cr}	Table 2, Item 5		mΩ
			Mated Shell Conductivity	Table 2 Item 3	V_D	Not applicable		mV
			Insulation Resistance	Table 2 Item 1	R_i	Table 2, Item 1		MΩ
			Voltage Proof Leakage Current	Table 2 Item 2	I_L	Table 2, Item 2		mA
11	Permanence of Marking	Para. 9.19	-	-	-	-		
12	Mating/Unmating Forces	Para. 9.20	Force	-	F	Para. 4.3.5 of this spec		N
13	High Temperature Storage	Para. 9.21	**Initial Measurements** Low Level Contact Resistance	Table 2, Item 4	R_{cl}	Record Values		mΩ
			Mated Shell Conductivity	Table 2, Item 3	V_D	Not applicable		mV
			Final Measurements Visual Examination	-	-	-	-	
			Mating/Unmating Forces		F	Para. 4.3.5 of this spec		N
			Low Level Contact Resistance Drift	Table 2, Item 4	ΔR_{cl}	-	3	mΩ

No.	ESCC Generic Spec. No. 3401		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests Note 1	Test Method and Conditions	Identification	Conditions		Min	Max	
			Rated Current Contact Resistance	Table 2, Item 5	R_{cr}	Table 2, Item 5		mΩ
			Mated Shell Conductivity	Table 2 Item 3	V_D	Not applicable		mV
			Insulation Resistance	Table 2 Item 1	R_i	Table 2, Item 1		MΩ
			Voltage Proof Leakage Current	Table 2 Item 2	I_L	Table 2, Item 2		mA
			Contact Retention (In insert)	Para. 4.3.4 of this spec.		ESCC 3401 Para. 9.17		
14	Corrosion	Para. 9.22	Visual Examination	-	-	-	-	
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		Table 3	Not applicable		
17	High Temperature Measurements	Para. 9.25	Insulation Resistance	Table 2 Item 1 (2)	R_i	10	-	MΩ
18	Overload Test	Para. 9.26	Internal Temperature	-	T	-	+100	°C
			Rated Current Contact Resistance	Table 2, Item 5	R_{cr}	Table 2, Item 5		mΩ
			Mated Shell Conductivity	Table 2 Item 3	V_D	Not applicable		mV
			Insulation Resistance	Table 2 Item 1	R_i	Table 2, Item 1		MΩ
			Voltage Proof Leakage Current	Table 2 Item 2	I_L	Table 2, Item 2		mA
19	Maintenance Aging	Para. 9.27 & ~~Para. 4.2.4 of this spec.~~	Visual Examination	-	-	-	-	
			Contact Retention (in Insert)	Para. 4.3.4 of this spec.		Not applicable		N
20	Engage/Separation Forces	Para. 9.28 & Para. 4.3.9 of this spec.	Force	-	F	Para. 4.3.9 of this spec.		N
21	Oversize Pin Exclusion	Para. 9.29 & Para. 4.3.10 of this spec.	Not applicable	-	-	-	-	-
22	Probe Damage	Para. 9.30 & Para. 4.3.11 of this spec.	Not applicable	-	-	-	-	-
23	Solderability	Para. 9.31 & Para. 4.3.12 of this spec.	Not applicable	-	-	-	-	-

NOTES:

1. The tests in this Table refer to either Chart IV or V and shall be used as applicable.
2. T_{amb}=+125°C.