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**CONNECTORS, ELECTRICAL, SINGLE-IN-LINE,
MICROMINIATURE**

BASED ON TYPE MTB 1

ESCC Detail Specification No. 3401/031

Issue 8	November 2017
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DCR No.	CHANGE DESCRIPTION
1097	Specification upissued to incorporate changes per DCR.

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1 GENERAL

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics, test and inspection data for Connectors, Electrical, Single-in-Line, Microminiature, with non-removable crimp-type contacts and their associated insulated wires and uninsulated solid wires and Solder Bucket based on Type MTB 1.

It shall be read in conjunction with:

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

the requirements of which are supplemented herein.

1.2 COMPONENT TYPE VARIANTS / RANGE OF COMPONENTS

The single-in-line connectors specified herein are scheduled in Table 1(a). Alignment is effected by 2 guide posts; the posts are located at either end of the receptacle.

1.2.1 Insert Sizes for Variant 01

These range from 5 to 50. Since 4 cavities are used (2 guide posts and 2 epoxy-filled cavities at either end) the number of available contact positions ranges from 1 to 46.

1.2.2 Insert Sizes for Variant 02

These range from 6 to 50. Since 5 cavities are used (2 guide posts and 2 epoxy-filled cavities at either end plus 1 cavity for latching) the number of available contact positions ranges from 1 to 45.

Polarisation may be achieved by means of additional guide posts (according to Customer requirements). 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 as scheduled in Table 1(b).

1.4 PARAMETER DERATING INFORMATION

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

1.5 PHYSICAL DIMENSIONS

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

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](#) for Connectors, Electrical, Non-Filtered, Circular and Rectangular.
- (b) ESCC Detail Specification No. [3901/013](#), PTFE Insulated Wires and Cables, 600V, -100 to +200°C.
- (c) QQ-W-343, Wires, Electrical, Uninsulated.
- (d) MIL-DTL-45204, Gold-Plating, Electro-deposited.
- (e) SAE-AMS 2418, Copper-Plating.

TABLE 1(a) - TYPE VARIANTS

Variant	Latching Option
01	Without latching
02	With latching

TABLE 1(b) - MAXIMUM WEIGHTS

Description		Weight (g)
Contact	Male	0.02
	Female	0.02
	Male Solder	0.04
	Female Solder	0.04
Body (per contact cavity)	Plug	0.21
	Receptacle	0.006
Guide Post, Stainless Steel (2 per connector)	-	0.035
Wire	Figures 2.2 and 2.3	

TABLE 1(c) - MATING AND UNMATING FORCES

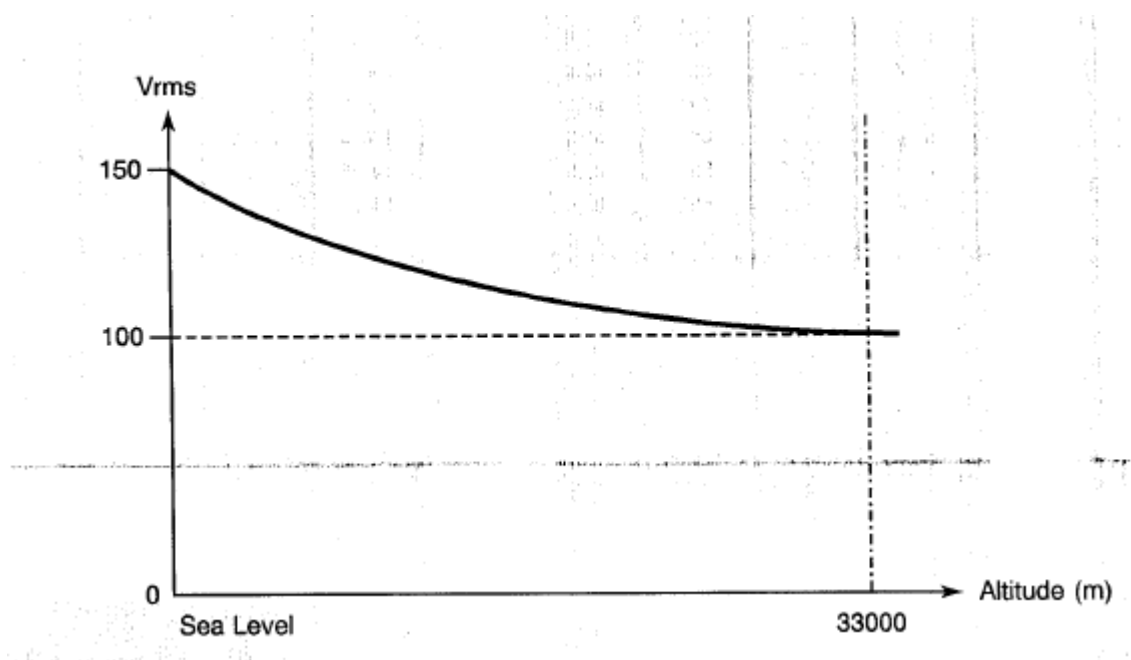
Description	Mating		Unmating	
	Min	Max	Min	Max
Per contact	-	2.2N	0.14N	2.2N

TABLE 1(d) - MAXIMUM RATINGS

No.	Characteristics	Symbol	Maximum Rating	Unit
1	Working Voltage (Sea Level)	U_R	150	Vrms
2	Rated Current (AWG26 and Uninsulated Solid Wire)	I_R	2.5	A
3	Rated Current (AWG28)	I_R	1.5	A
4	Operating Temperature Range	T_{op}	-55 to +125	°C
5	Storage Temperature Range	T_{stg}	-55 to +125	°C
6	Soldering Temperature	T_{sol}	+260 (1)	°C

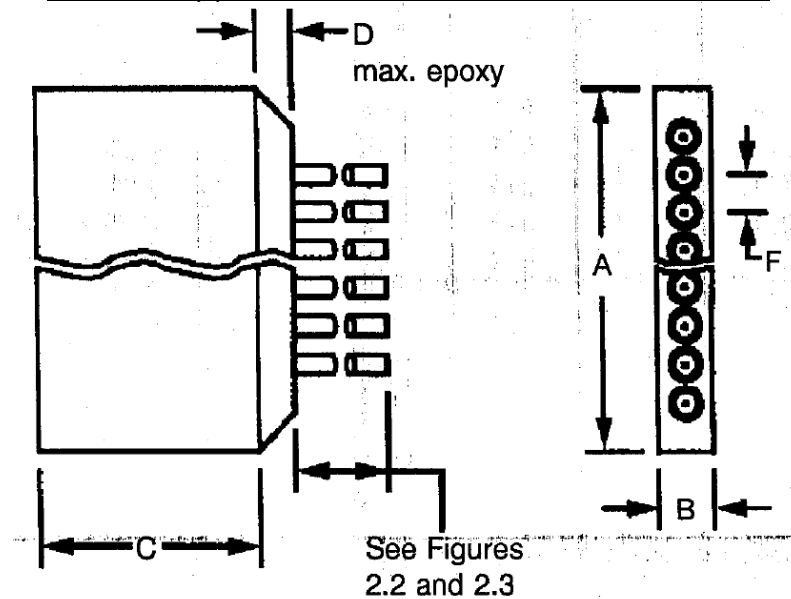
NOTES:

1. Duration 10s maximum and the same contact shall not be resoldered until 3 minutes have elapsed.

FIGURE 1 - PARAMETER DERATING INFORMATION
FIGURE 1(a) - WORKING VOLTAGE VERSUS ALTITUDE

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

Number of Contacts per Connector	Maximum Current per Contact (A)	
	Wire Size	
	AWG26 and Uninsulated Solid Wire	AWG28
2 - 4	2	1.4
5 - 14	1.8	1.2
15 and over	1.4	0.9

FIGURE 2 – PHYSICAL DIMENSIONS

FIGURE 2.1(a) - CONNECTORS PLUG - MALE CONTACTS


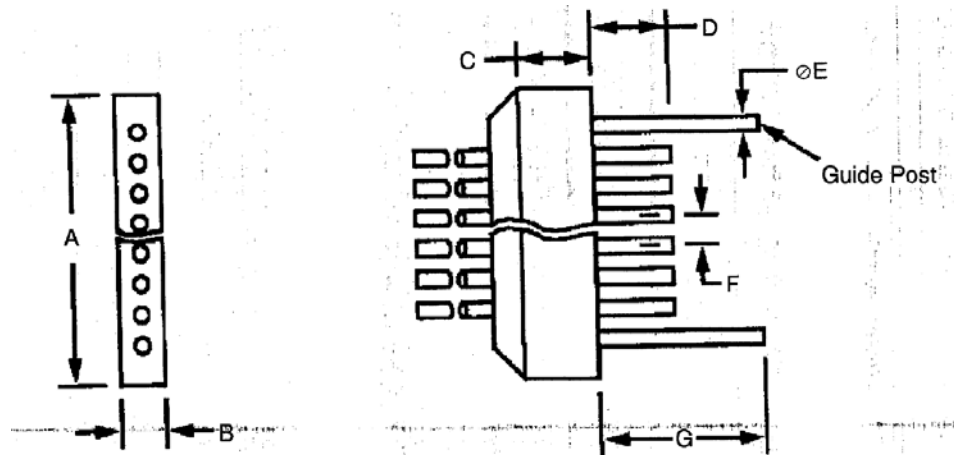
Insert Size	A		B		C		D	F
	Min	Max	Min	Max	Min	Max	Max	Typical
5	6.47	7.23	1.9	2.16	7.06	7.32	3.18	1.27
6	7.75	8.51	1.9	2.16	7.06	7.32	3.18	1.27
7	9.02	9.78	1.9	2.16	7.06	7.32	3.18	1.27
8	10.29	11.05	1.9	2.16	7.06	7.32	3.18	1.27
9	11.56	12.32	1.9	2.16	7.06	7.32	3.18	1.27
10	12.82	13.58	1.9	2.16	7.06	7.32	3.18	1.27
11	14.1	14.86	1.9	2.16	7.06	7.32	3.18	1.27
12	15.37	16.13	1.9	2.16	7.06	7.32	3.18	1.27
13	16.64	17.4	1.9	2.16	7.06	7.32	3.18	1.27
14	17.91	18.67	1.9	2.16	7.06	7.32	3.18	1.27
15	19.18	20.04	1.9	2.16	7.06	7.32	3.18	1.27
16	20.45	21.21	1.9	2.16	7.06	7.32	3.18	1.27
17	21.72	22.48	1.9	2.16	7.06	7.32	3.18	1.27
18	22.99	23.75	1.9	2.16	7.06	7.32	3.18	1.27
19	24.26	25.02	1.9	2.16	7.06	7.32	3.18	1.27
20	25.53	26.29	1.9	2.16	7.06	7.32	3.18	1.27
21	26.8	27.56	1.9	2.16	7.06	7.32	3.18	1.27
22	28.07	28.83	1.9	2.16	7.06	7.32	3.18	1.27
23	29.34	30.1	1.9	2.16	7.06	7.32	3.18	1.27
24	30.61	31.47	1.9	2.16	7.06	7.32	3.18	1.27
25	31.88	32.64	1.9	2.16	7.06	7.32	3.18	1.27
26	33.15	33.91	1.9	2.16	7.06	7.32	3.18	1.27
27	34.42	35.18	1.9	2.16	7.06	7.32	3.18	1.27
28	35.69	46.45	1.9	2.16	7.06	7.32	3.18	1.27
29	36.96	37.72	1.9	2.16	7.06	7.32	3.18	1.27
30	38.23	38.99	1.9	2.16	7.06	7.32	3.18	1.27

Insert Size	A		B		C		D	F
	Min	Max	Min	Max	Min	Max	Max	Typical
31	39.5	40.26	1.9	2.16	7.06	7.32	3.18	1.27
32	40.77	41.53	1.9	2.16	7.06	7.32	3.18	1.27
33	42.04	42.8	1.9	2.16	7.06	7.32	3.18	1.27
34	43.31	44.07	1.9	2.16	7.06	7.32	3.18	1.27
35	44.58	45.34	1.9	2.16	7.06	7.32	3.18	1.27
36	45.85	46.61	1.9	2.16	7.06	7.32	3.18	1.27
37	47.12	47.88	1.9	2.16	7.06	7.32	3.18	1.27
38	48.39	49.15	1.9	2.16	7.06	7.32	3.18	1.27
39	49.66	50.42	1.9	2.16	7.06	7.32	3.18	1.27
40	50.93	51.69	1.9	2.16	7.06	7.32	3.18	1.27
41	52.2	52.96	1.9	2.16	7.06	7.32	3.18	1.27
42	53.47	54.23	1.9	2.16	7.06	7.32	3.18	1.27
43	54.74	55.5	1.9	2.16	7.06	7.32	3.18	1.27
44	56.01	56.77	1.9	2.16	7.06	7.32	3.18	1.27
45	57.28	58.04	1.9	2.16	7.06	7.32	3.18	1.27
46	58.55	59.31	1.9	2.16	7.06	7.32	3.18	1.27
47	59.82	60.58	1.9	2.16	7.06	7.32	3.18	1.27
48	61.09	61.85	1.9	2.16	7.06	7.32	3.18	1.27
49	62.36	63.12	1.9	2.16	7.06	7.32	3.18	1.27
50	63.63	64.39	1.9	2.16	7.06	7.32	3.18	1.27

NOTES:

1. All dimensions are in millimetres.

FIGURE 2.1(b) - CONNECTORS RECEPTACLE - FEMALE CONTACT



Insert Size	A		B		C		D		ØE		F	G	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Typical	Min	Max
5	6.47	7.23	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
6	7.75	8.51	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
7	9.02	9.78	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
8	10.29	11.05	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
9	11.56	12.32	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
10	12.82	13.58	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
11	14.1	14.86	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
12	15.37	16.13	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
13	16.64	17.4	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
14	17.91	18.67	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
15	19.18	20.04	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
16	20.45	21.21	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
17	21.72	22.48	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
18	22.99	23.75	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
19	24.26	25.02	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
20	25.53	26.29	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
21	26.8	27.56	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
22	28.07	28.83	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
23	29.34	30.1	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
24	30.61	31.47	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
25	31.88	32.64	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
26	33.15	33.91	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
27	34.42	35.18	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
28	35.69	36.45	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
29	36.96	37.72	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
30	38.23	38.99	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
31	39.5	40.26	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
32	40.77	41.53	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
33	42.04	42.8	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
34	43.31	44.07	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
35	44.58	45.34	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33

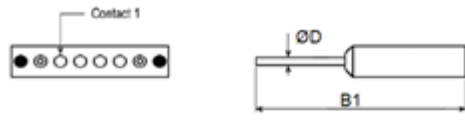
Insert Size	A		B		C		D		ØE		F	G	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Typical	Min	Max
36	45.85	46.61	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
37	47.12	47.88	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
38	48.39	49.15	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
39	49.66	50.42	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
40	50.93	51.69	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
41	52.2	52.96	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
42	53.47	54.23	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
43	54.74	55.5	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
44	56.01	56.77	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
45	57.28	58.04	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
46	58.55	59.31	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
47	59.82	60.58	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
48	61.09	61.85	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
49	62.36	63.12	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33
50	63.63	64.39	1.9	2.16	2.41	2.67	3.07	3.33	0.78	0.84	1.27	4.83	5.33

NOTES:

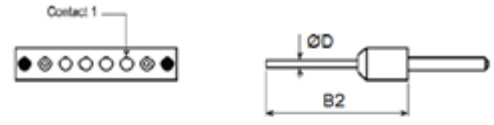
1. All dimensions are in millimetres.

FIGURE 2.2 - UNINSULATED SOLID WIRES

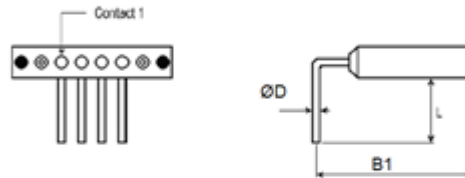
FR116 – Plug (pin contacts)



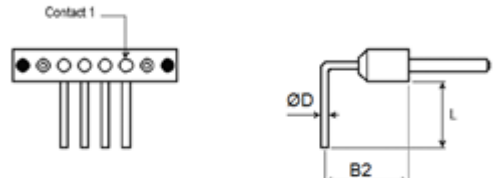
FR116 – Receptacle (socket contact)



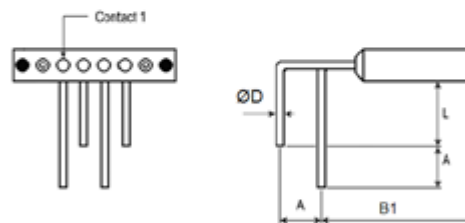
FR116 C – Plug (pin contacts)



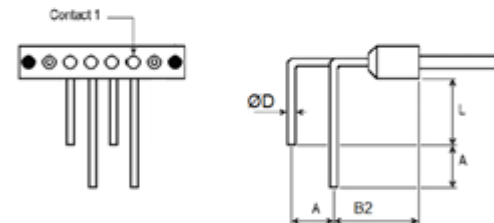
FR116 C – Receptacle (socket contact)



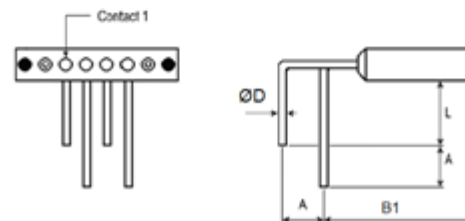
FR116 D1 – Plug (pin contacts)



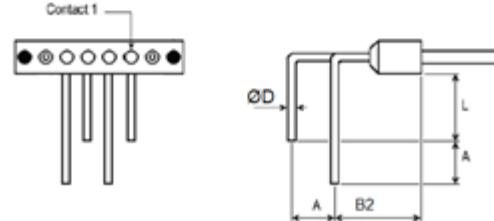
FR116 D1 – Receptacle (socket contact)



FR116 D2 – Plug (pin contacts)



FR116 D2 – Receptacle (socket contact)



Terminations Code	FR116	FR116 C	FR116 D1	FR116 D2
Wire Size (AWG)	25	25	25	25
Max Diameter 'D' (mm)	0.51	0.51	0.51	0.51
Min Diameter 'D' (mm)	0.4	0.4	0.4	0.4
Max Weight (g/m)	1.6	1.6	1.6	1.6
L (mm)	-	6	6	6
A (mm)	-	-	2.54 Typ.	2.54 Typ.
B1 (mm)	32.6 min	9.73 Typ.	9.73 Typ.	9.73 Typ.
B2 (mm)	28 min	5.08 Typ.	5.08 Typ.	5.08 Typ.

FIGURE 2.3 - INSULATED WIRES

Plug (pin contact)



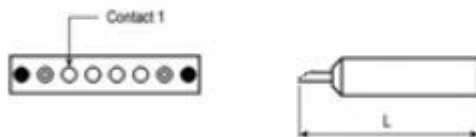
Receptacle (socket contact)



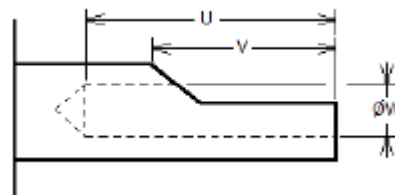
Minimum length and maximum wire weight: see Para. 4.5.4.3.

FIGURE 2.4 – SOLDER BUCKET

Plug (pin contact)



Receptacle (socket contact)

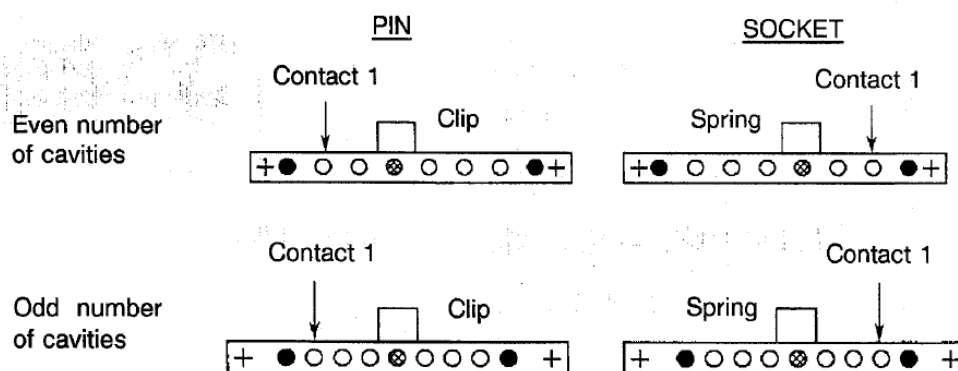
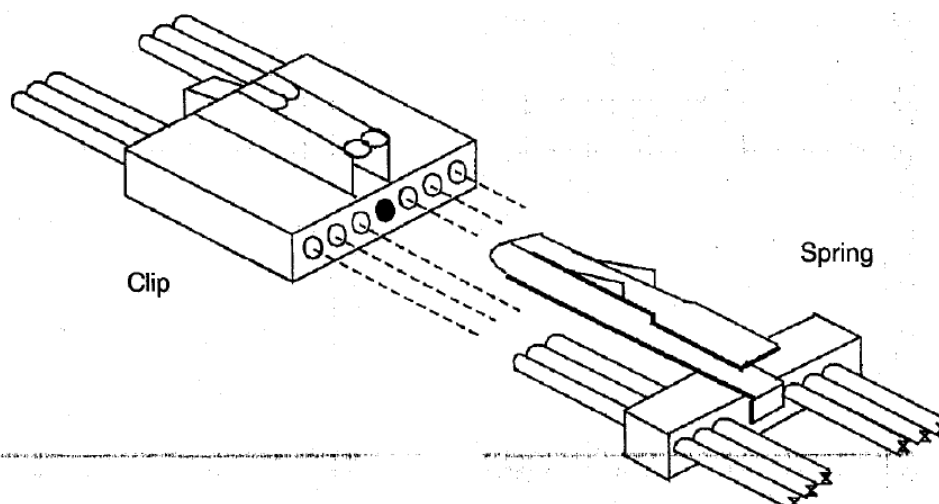


	L	U		V		ØW	
	Max	Min	Max	Min	Max	Min	Max
Plug	11.2	1.8	2.2	1.5	1.8	0.55	0.61
Receptacle	6.55	2	2.4	1.5	1.8	0.55	0.61

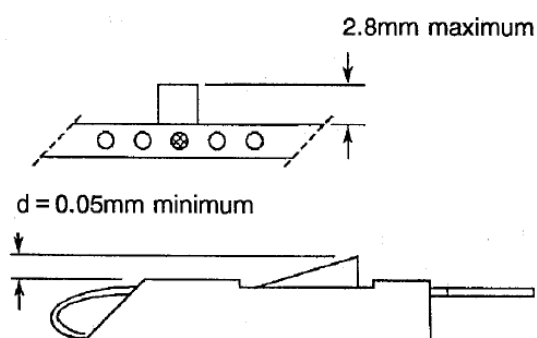
NOTES

1. All dimensions are in millimetres.
2. Maximum wire accepted in the solder cup: AWG 26.

FIGURE 2.5 – LATCHING



(Seen from contact side)



Latching force = 10N maximum

FIGURE 2.6 - CONTACT POSITION

FIGURE 2.6.1 - MOUNTING CONDITION

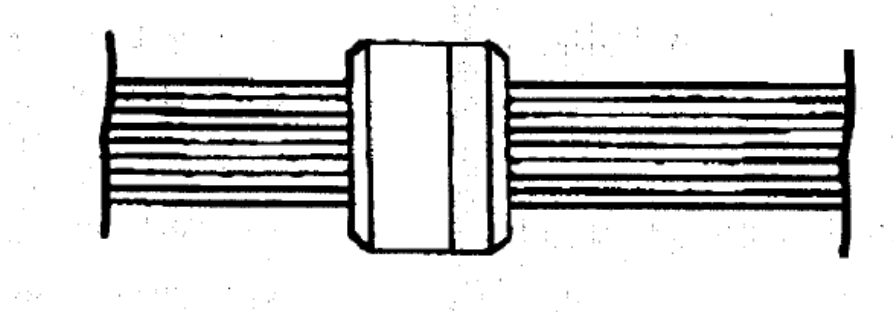


FIGURE 2.6.2 - PLUG MALE CONTACT

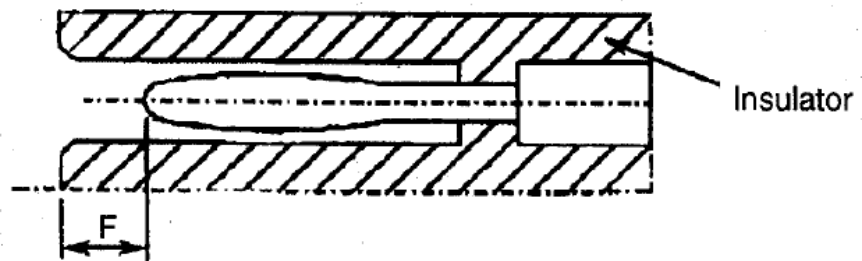
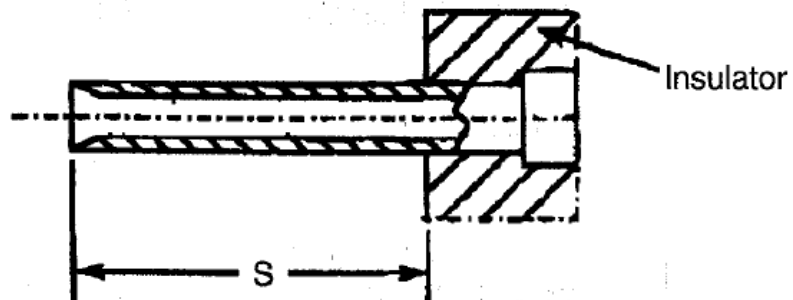


FIGURE 2.6.3 - RECEPTACLE FEMALE CONTACT



F		S	
Min	Max	Min	Max
0.25	0.91	3.07	3.33

NOTES

1. All dimensions are in millimetres.

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.

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**

- (a) 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. 9.1.1.4, Mated Shell Conductivity: Not applicable.
(b) Para. 9.3, Contact Retainer Test: Not applicable.
(c) Para. 9.4, Contact Capability: This test shall be performed on male contacts. For details see Para. 4.3.3 of this specification.
(d) Para. 9.5, Magnetism Level: Not applicable.

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

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. 9.17, Contact Retention (In Insert): Not applicable with male contact.
(e) Para. 9.27, Maintenance Ageing: Not applicable.
(f) Para. 9.29, Oversize Pin Exclusion: Not applicable.
(g) Para. 9.30, Probe Damage: Not applicable.
(h) Latching shall be performed as specified in Para. 4.3.13 of this specification.
(i) Para. 9.31, Solderability: Only applicable to FR164 termination.

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. 9.17, Contact Retention (In Insert): Not applicable with male contact.
- (e) Para. 9.27, Maintenance Ageing: Not applicable.
- (f) Para. 9.29, Oversize Pin Exclusion: Not applicable.
- (g) Para. 9.30, Probe Damage: Not applicable.
- (h) Latching shall be performed as specified in Para. 4.3.13 of this specification.

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.

4.3.2 Weight

The maximum weight of the connectors specified herein shall be calculated on the basis of, and be in accordance with, the values given in Table 1(b) and in Figures 2.2 and 2.3 of this specification.

4.3.3 Contact Capability

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

Measurements	Pick-Up Weight	Drop Weight
Weight (g)	14	170
Inner Gauge Diameter (mm) (1)	0.582 - 0.587	0.559 - 0.564
Insertion Depth (mm)	1.5	1.5

NOTES:

1. See Figure 3 for ØA.

4.3.4 Contact Retention (In Insert)

Contact retention within the insert shall be 22.25N. There shall be no displacement of the contact. Not applicable to male contacts.

4.3.5 Mating and Unmating Forces

The forces applied for mating and unmating of the connectors shall conform to the values specified in Table 1(c).

4.3.6 Insert Retention (In Shell)

Not applicable.

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 contact engagement and separation forces of the male contacts shall be tested to a depth of 1.5mm with the applicable test gauge fixture specified in Figure 3 of this specification, and shall not exceed the values of the table hereunder.

Measurements	Inner Diameter (mm)		Separation Force Min (N)	Engagement Force Max (N)
	Min	Max		
Max Gauge Fixture	0.559	0.564	-	1.667
Min Gauge Fixture	0.582	0.587	0.137	-

4.3.10 Oversize Pin Exclusion

Not applicable.

4.3.11 Probe Damage

Not applicable.

4.3.12 Solderability

Only applicable on FR164 termination. Size A soldering iron shall be used.

4.3.13 Latching

Unlocking is achieved by applying a force of 3N minimum, perpendicular to the connector at the end of the spring.

The endurance test (10 cycles of mating/unmating) shall be performed with the force, applied at the end of the spring, necessary to achieve a travel of 1mm (unlocking travel = 0.5mm, total travel = 1.15mm). The requirement after the endurance test is that dimension d = 0.05mm, minimum.

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 Inserts

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

4.4.2 Contacts

4.4.2.1 *Female Contacts*

The contact body material and finish shall either be copper alloy with an underplate of 1µm minimum of copper to SAE-AMS 2418, gold plated with 1.27µm minimum of gold Type 2, Grade C of MIL-DTL-45204. Measurement of thickness shall be performed at a distance of 1.5mm from the engagement end.

4.4.2.2 *Male Contacts*

The contact body and the bundle material and finish shall either be copper alloy with an underplate of 1µm minimum of copper to SAE-AMS 2418, gold plated with 1.27µm minimum of gold, Type 2, Grade C of MIL-DTL-45204. Measurement of thickness shall be performed at a distance of 1.5mm from the engagement end.

4.4.3 Guide Posts

Guide posts shall be made from passivated stainless steel, Type 303.

4.4.4 Latching

Clip and spring shall be made of passivated stainless steel.

4.4.5 Insulated Wires

Wire materials and finishes shall be in accordance with the requirements specified in Para. 4.4 of ESCC Detail Specification No. [3901/013](#).

4.4.6 Uninsulated Solid Wires

Uninsulated solid wire material and finish shall either be copper alloy in accordance with Type 'S' as specified in QQ-W-343, gold-plated in accordance with Class ØØ, Grade C or D, as specified in MIL-DTL-45204.

4.4.7 Rear Potting

Rear potting shall be made of epoxy resin.

4.5 MARKING

4.5.1 General

The marking of 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 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) The ESCC Component Number.
- (b) Characteristics.
- (c) Traceability Information.

4.5.2 Contact Identification

Not applicable.

4.5.3 The ESCC Component Number

ESCC Component Number shall be constituted and marked as follows:

Example: 340103101B

- Detail Specification Number: 3401031
- Type Variant (see Table 1(a)): 01
- Testing level: B

4.5.4 Characteristics

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

- (a) Insert size
- (b) Contact Type
- (c) Termination Type
- (d) Polarisation (optional)

The information shall be constituted and marked as follows:

Example: 50P FR112 *

- Insert Size: 50
- Contact Type: P
- Termination Type: FR112
- Polarisation: *

4.5.4.1 Insert Size

The Insert size shall be designated by 2 digits representing the number of available cavities plus 4 additional cavities plus (see Para. 1.2):

- (a) 4 additional cavities for Variant 01.
The specified numbers range from 05 through to 50 maximum.
- (b) 5 additional cavities for Variant 02.
The specified numbers range from 06 through to 50 maximum.

4.5.4.2 Contact Types

Contact types shall be indicated by the following code letters.

Code Letter	Contact Type
P	Male
S	Female

4.5.4.3 Termination Types

Termination types define length and weight of insulated wire or uninsulated solid wire according to Figures 2.2 and 2.3 or solder type according to Figure 2.4 as follows:

Code	Type (see Figure 2)	Min Length (mm)	Max. Weight
FR112	Wire AWG 26	508	See 3901/013
FR113	Wire AWG 26	914	See 3901/013
FR114	Wire AWG 28	508	See 3901/013
FR115	Wire AWG 28	914	See 3901/013
FR116	Uninsulated Solid Wire	See Figure 2.2	See Figure 2.2
FR116 C	Uninsulated Solid 90°C Formed Wire	See Figure 2.2	See Figure 2.2
FR116 D1	Uninsulated Solid 90°C Formed Wire (Long Terminations on Odd Contacts)	See Figure 2.2	See Figure 2.2
FR116 D2	Uninsulated Solid 90°C Formed Wire (Long Terminations on Even Contacts)	See Figure 2.2	See Figure 2.2
FR164	Solder Bucket	N/A	See Table 1(b)

4.5.4.4 Polarisation

The marking of the cavity number used for the polarisation is optional and is used only in case the Orderer wishes to specify his own polarisation means by epoxy-filled cavities or guide posts (see Para. 1.2). There is no mandatory requirement for this part of the marking.

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, these measurements shall be performed at $T_{amb} = +22 \pm 3^{\circ}\text{C}$.

4.6.2 Electrical Measurements at High and Low Temperatures

Not applicable.

4.6.3 Circuits for Electrical Measurements (Figure 4)

Not applicable.

4.7 BURN-IN AND ELECTRICAL MEASUREMENTS

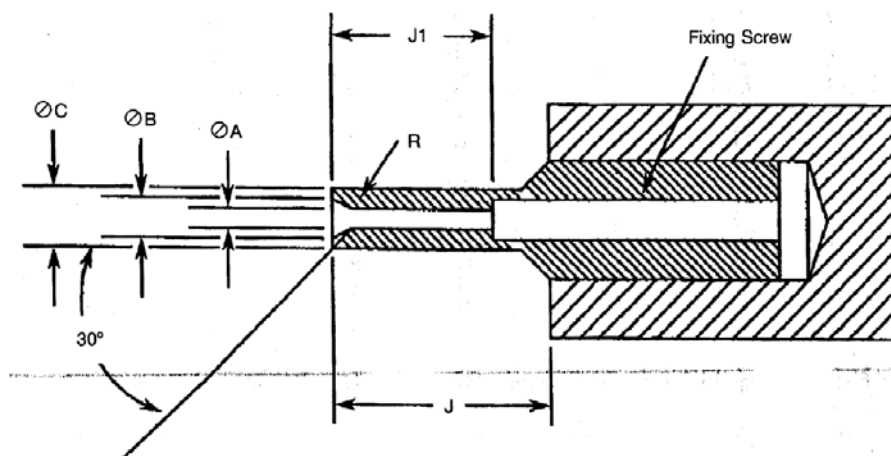
Not applicable.

TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE

No.	Characteristics	Symbol	ESCC 3401 Test Method	Test Conditions	Limits		Unit
					Min	Max	
1	Insulation Resistance	R_i	Para. 9.1.1.1	Para. 9.1.1.1	5000	-	$\text{M}\Omega$
2	Voltage Proof Leakage Current	I_L	Para. 9.1.1.2	600Vrms	-	2	mA
4	Contact Resistance (Low Level Current)	$R_{cl} \text{ max}$	Para. 9.1.1.3	Para. 9.1.1.3	-	6	$\text{m}\Omega$
5	Contact Resistance (Rated Current)	$R_{cr} \text{ max}$	Para. 9.1.1.3	Table 1(d)	-	5	$\text{m}\Omega$

TABLES 3, 4, 5

Not applicable.

FIGURE 3 – GAUGE FIXTURE

Maximum Gauge

Weight (g)	170		
Dimension (mm)	Limits		Remarks
	Min	Max	
ØA	0.559	0.564	-
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

Weight (g)	14		
Dimension (mm)	Limits		Remarks
	Min	Max	
ØA	0.582	0.587	-
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

- Radius 'R' must be tangent to entry chamfer and ØA.

ØA and entry chamfer must be polished to.



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 stated, the measurements shall be performed at $T_{amb} = +22 \pm 3^{\circ}\text{C}$.

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 tests shall be those specified in Table 6. Unless otherwise stated, the measurements shall be performed at $T_{amb} = +22 \pm 3^{\circ}\text{C}$.

4.8.4 Conditions for Operating Life Test (Part of Endurance Testing)

Not applicable.

4.8.5 Electrical Circuits for Operating Life Test (Figure 5)

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 temperature to be applied shall be the maximum storage temperature specified in Table 1(b) of this specification.

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

No.	ESCC Generic Spec. 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	ESCC 3401 Para. 9.9	-	-	Not applicable		
02	Wiring	Para. 9.10 and Table 1(d) of this specification	Low Level Contact Resistance	Table 2 Item 4	Rcl	Table 2 Item 4		
03	Vibration	Para. 9.11	Final Measurements Full Engagement Visual Examination	-	-	-	-	
04	Shock or Bump	Para. 9.12	Full Engagement Visual Examination	-	-	-	-	

No.	ESCC Generic Spec. No. 3401		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests (1)	Test Method and Conditions	Identification	Conditions		Min	Max	
05	Climatic Sequence	Para. 9.13	Dry Heat Insulation Resistance	At High Temperature Table 2 Item 1	R _i	10	-	MΩ
			Low Air Pressure Voltage Proof Leakage Current	Figure 1	I _L	ESCC 3401 Para. 9.13.5		-
			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	Table 2 Item 1	R _i	Table 2 Item 1		
			Voltage Proof Leakage Current	Table 2 Item 2	I _L	Table 2 Item 2		
06	Plating Thickness	Para. 9.14	Thickness	-	-	Para. 4.4.2 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	Table 2 Item 1	R _i	Table 2 Item 1		
			Voltage Proof Leakage Current	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	Not applicable for male contacts	-	ESCC 3401 Para. 9.17		
10	Endurance	Para. 9.18	Initial Measurements Mating/Unmating Forces	-	F	Para. 4.3.5 of this spec.		
			Low Level Contact Resistance	Table 2 Item 4	R _{cl}	Record Values		
			Final Measurements Visual Examination	-	-	-	-	
			Mating/Unmating Forces	-	F	Para. 4.3.5 of this spec.		
			Low Level Contact Resistance Drift	Table 2 Item 4	ΔR _{cl}	-	3	mΩ
			Insulation Resistance	Table 2 Item 1	R _i	Table 2 Item 1		
			Voltage Proof Leakage Current	Table 2 Item 2	I _L	Table 2 Item 2		
11	Permanence of Marking	Para. 9.19	-	-	-	-	-	
12	Mating/Unmating Forces	Para. 9.20	Force	-	F	Para. 4.3.5 of this spec.		

No.	ESCC Generic Spec. No. 3401		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests (1)	Test Method and Conditions	Identification	Conditions		Min	Max	
13	High Temperature Storage	Para. 9.21	Initial Measurements Low Level Contact Resistance Final Measurements Visual Examination Mating/Unmating Forces Low Level Contact Resistance Drift Rated Current Contact Resistance Insulation Resistance Voltage Proof Leakage Current Contact Retention (In Insert)	Table 2 Item 4 - - Table 2 Item 4 Table 2 Item 5 Table 2 Item 1 Table 2 Item 2 Para. 4.3.4 of this spec.	Rcl - F ΔRcl Rcr Ri I _L -	Record Values - Para. 4.3.5 of this spec. - 3 Table 2 Item 5 Table 2 Item 1 Table 2 Item 2 ESCC 3401 Para. 9.17	mØ	
14	Corrosion	Para. 9.22	Visual Examination	-	-	-	-	
15	Insert Retention (In Shell)	Para. 9.23 & Para. 4.3.6 of this spec.	Visual Examination	-	-	Not applicable		
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	5000	-	MΩ
18	Overload Test	Para. 9.26	Internal Temperature Rated Current Contact Resistance Insulation Resistance Voltage Proof Leakage Current	- Table 2 Item 5 Table 2 Item 1 Table 2 Item 2	T Rcr Ri I _L	- +100 Table 2 Item 5 Table 2 Item 1 Table 2 Item 2	°C	
19	Maintenance Ageing	Para. 9.27 & Paras. 4.2.4 and 4.2.5 of this spec.	Visual Examination Contact Retention (In Insert)	- -	- -	Not applicable Not applicable		
20	Engagement/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.	-	-	-	Not applicable		
22	Probe Damage	Para. 9.30 & Para. 4.3.11 of this spec.	Contact Separation Force	-	-	Not applicable		
23	Solderability	Para. 9.31 & Para. 4.3.12 of this spec.	-	-	-	ESCC 3401 Para. 9.31		

NOTES

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

APPENDIX A**AGREED DEVIATIONS FOR C&K COMPONENTS (F)**

ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS
Paras. 4.2.2, Deviations from Final Production Tests (Chart II)	Para. 9.2, Mating Verification may be omitted if proper mating has already been verified by use of the dedicated electrical test equipment as defined in the C&K PID.
	Para. 9.4, Contact Capability: 100% Contact Capability Test may be omitted provided that a 100% visual inspection of the contacts is performed on each batch submitted to tests defined in the C&K PID requirements.