



**CONTACTS, COAXIAL, CRIMP-TYPE, SOLDER-TYPE  
AND PCB-TYPE FOR 3401/001 CONNECTORS AND  
MALE/FEMALE-TYPE FOR 3401/080 CONNECTOR  
SAVERS**

**ESCC Detail Specification No. 3401/004**

Issue 4	April 2014
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**1 GENERAL**

**1.1 SCOPE**

This specification details the ratings, physical and electrical characteristics, test and inspection data for Contacts, Coaxial, Crimp-type, Solder-type and PCB-type for 3401/001 Connectors and Male/Female-type for 3401/080 Connector Savers.

The specification shall be read in conjunction with:

- ESCC Generic Specification No. 3401, Connectors, Electrical, Non-Filtered, Circular and Rectangular.
- ESCC Detail Specification No. 3401/001, Connectors, Electrical, Rectangular, Non-removable Solder Bucket, PCB and Wire-wrap Contacts and Removable Coaxial and Power Contacts, Based on Type D\*M.
- ESCC Detail Specification No. 3401/080, Connector Savers, Electrical Rectangular, Miniature, Non-Removable Signal Contacts, and Removable Coaxial and Power Contacts.

the requirements of which are supplemented herein.

These contacts are not mounted in the connectors and are therefore delivered separately.

**1.2 TYPE VARIANTS**

Variants of the basic type contacts specified herein, which are covered by this specification, together with their mechanical characteristics, are given in Table 1(a).

**1.3 MAXIMUM RATINGS**

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

**1.4 PARAMETER DERATING INFORMATION (FIGURE 1)**

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

**1.5 PHYSICAL DIMENSIONS**

The physical dimensions of the contacts specified herein are shown in Figure 2.

**TABLE 1(a) - TYPE VARIANTS**

Variant	Type	Rear End	Max. Weight (g)	Accepted Cable Note 1	Assembly Method Braid/Sleeve
01	Male	Straight Cable	1.4	RG178B/U RG196A/U KX21A	Solder
02	Female	Straight Cable	1.5		Solder
03	Male	90° Cable	2		Solder
04	Female	90° Cable	2.2		Solder
05	Male	Straight Cable	1.4	KX22A RG179B/U	Solder
06	Female	Straight Cable	1.5		Solder

Variant	Type	Rear End	Max. Weight (g)	Accepted Cable Note 1	Assembly Method Braid/Sleeve
07	Male	90° Cable	2	RG188A/U RG316/U 50 CIS	Solder
08	Female	90° Cable	2.2		Solder
09	Male	Straight Cable	1.5	RG180B/U	Solder
10	Female	Straight Cable	1.7		Solder
11	Male	Straight Cable	1.4	RG178B/U RG196A/U KX21A	Crimp
12	Female	Straight Cable	1.5		Crimp
13	Male	90° Cable	2		Crimp
14	Female	90° Cable	2.2		Crimp
15	Male	Straight Cable	1.4	KX22A RG179B/U RG188A/U RG316/U 50 CIS	Crimp
16	Female	Straight Cable	1.5		Crimp
17	Male	90° Cable	2		Crimp
18	Female	90° Cable	2.2		Crimp
19	Male	Straight Cable	1.5	RG180B/U	Crimp
20	Female	Straight Cable	1.7		Crimp
21	Male	Straight PCB	1.2	N.A.	Crimp
22	Female	Straight PCB	1	N.A.	Crimp
23	Male	90° PCB (Note 2)	3.2	N.A.	Crimp
24	Female	90° PCB (Note 2)	3	N.A.	Crimp
25	Male/Female	N.A.	1.7	N.A.	N.A.

**NOTES:**

1.

Cable	Specification
50 CIS	ESCC No. 3902/001
RG178B/U RG179B/U RG180B/U RG188A/U RG196A/U RG316/U	MIL-DTL-17
KX21A KX22A	NFC 93550

2. Applicable to shell sizes E, A, B and C only.

**TABLE 1(b) - MAXIMUM RATINGS**

No.	Characteristics	Symbol	Maximum Rating	Unit	Remarks
1	Rated Voltage	$U_R$	See Figure 1	V	
2	Rated Current (Centre Contact)	$I_{CR}$	7.5	A	Note 1
4	Frequency Range	f	up to 1	GHz	
5	VSWR up to 1 GHz	-	1.4	-	Note 2
6	RF Insertion Loss at 1GHz	-	0.2	dB	Note 3
7	Operating Temperature Range	$T_{op}$	-55 to +125	°C	$T_{amb}$
8	Storage Temperature Range	$T_{stg}$	-55 to +125	°C	
9	Soldering Temperature	$T_{sol}$	+260	°C	Note 4

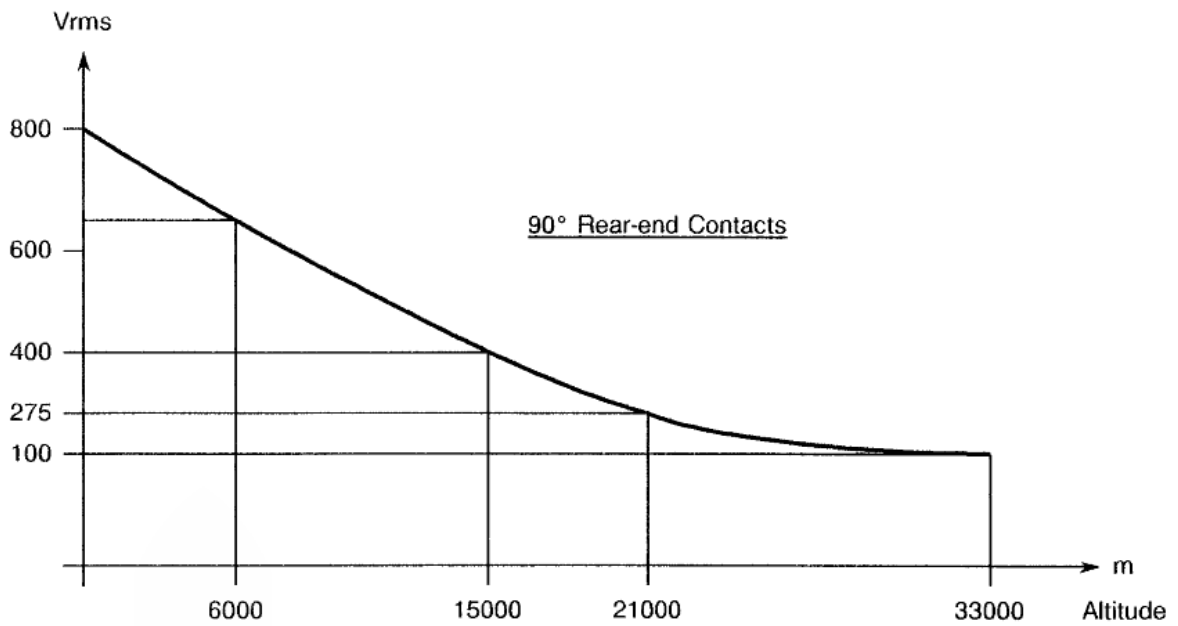
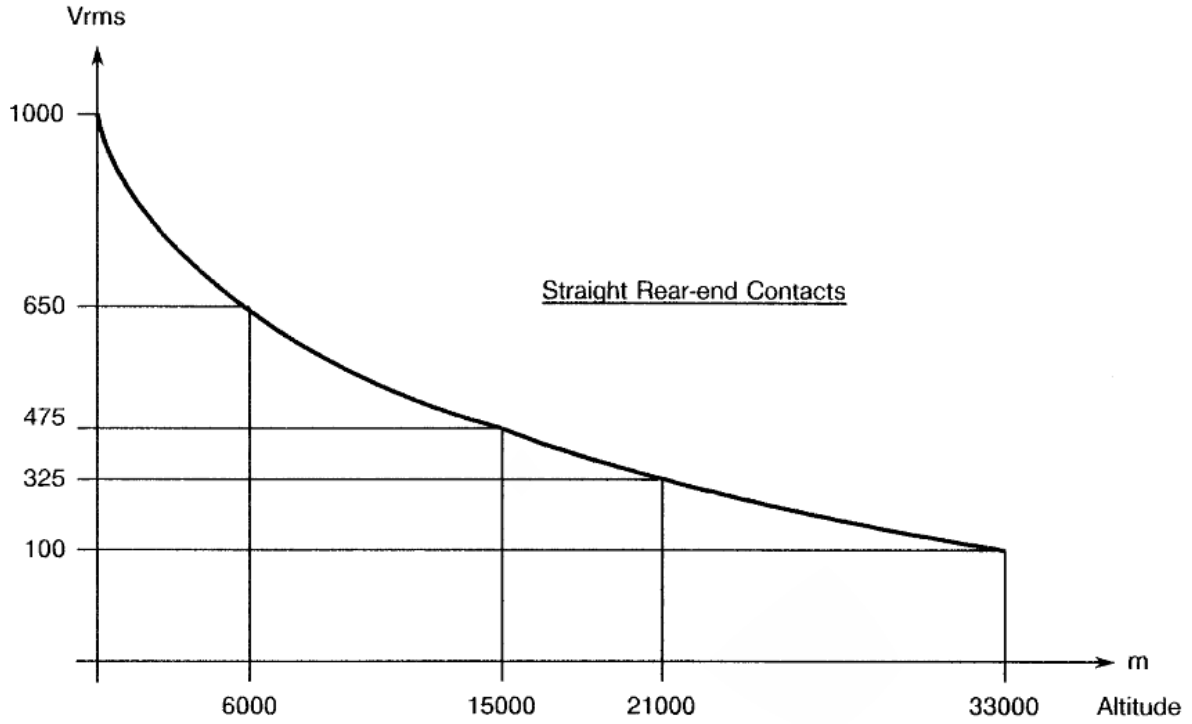
**NOTES:**

1. This may be limited by the current carrying capability of the cable to which the contact is fitted.
2. ESCC Generic Specification No. 3402, Para. 9.16.
3. ESCC Generic Specification No. 3402, Para. 9.19.
4. 10 seconds maximum.



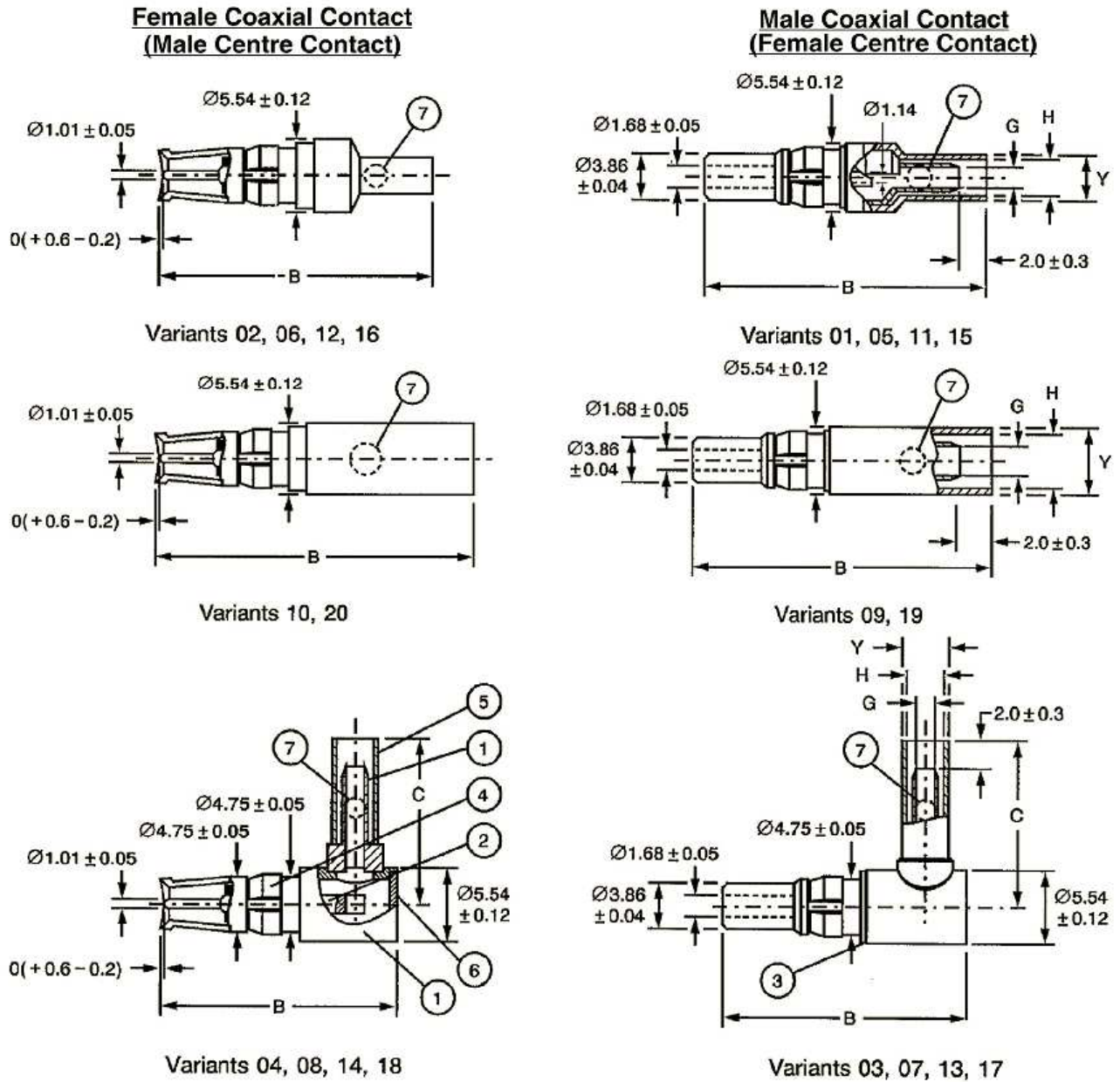
**FIGURE 1 - PARAMETER DERATING INFORMATION**

Voltage Proof versus Altitude



**FIGURE 2 - PHYSICAL DIMENSIONS**

**FIGURE 2(a) - CRIMP AND SOLDER TYPES**



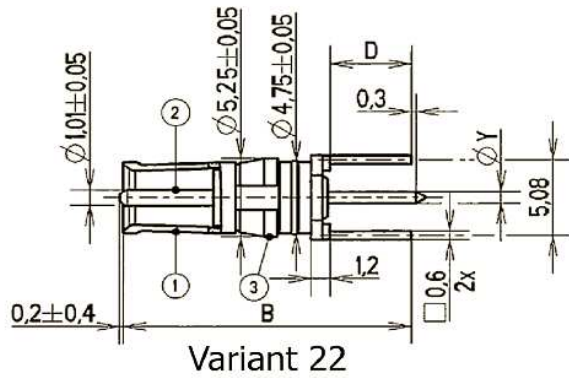
**NOTES:**

1. Outer contact.
2. Centre contact.
3. Washer (optional).
4. Ring.
5. Sleeve.
6. Cap.
7. Vent hole for solder (Variants 01 to 10 only).
8. All dimensions are in millimetres.
9. Lettered dimensions shall be as follows:

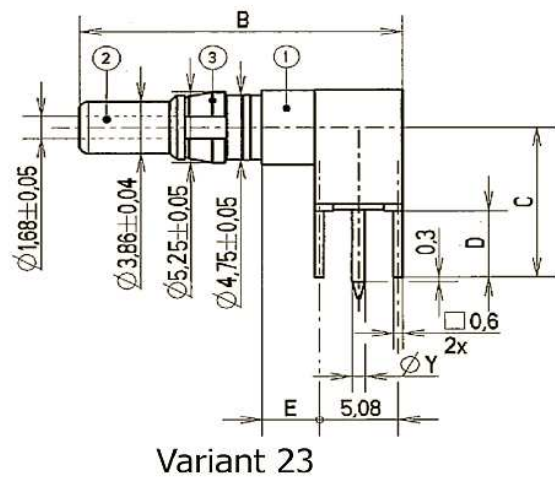
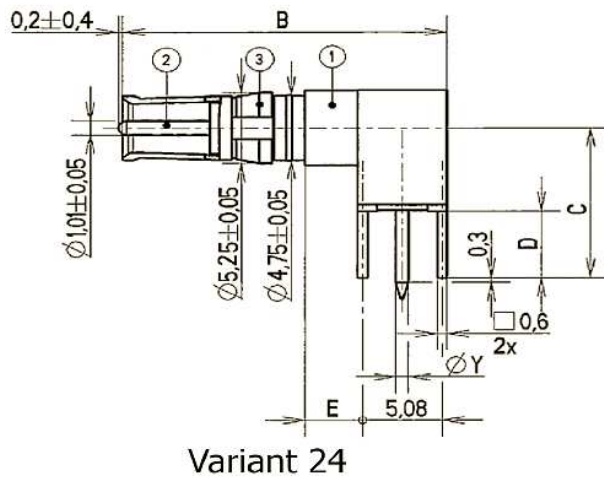
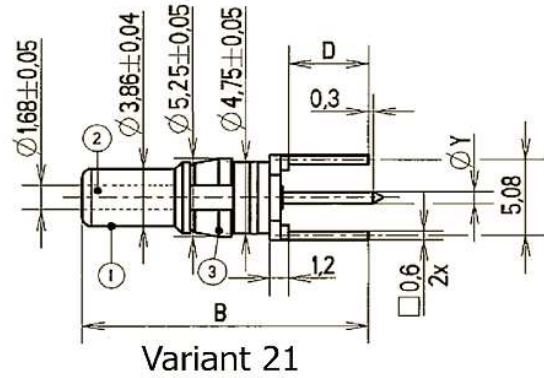
Variant	Dimensions (mm)				
	B Ref.	C Ref.	ØG Min.	ØH Min.	ØY Max.
01, 11	23.6	-	0.9	2.3	3.25
02, 12	23.6	-	0.9	2.3	3.25
03, 13	18.64	12.5	0.9	2.3	3.25
04, 14	18.64	12.5	0.9	2.3	3.25
05, 15	23.6	-	1.55	3.1	4.1
06, 16	23.6	-	1.55	3.1	4.1
07, 17	18.64	12.5	1.55	3.1	4.1
08, 18	18.64	12.5	1.55	3.1	4.1
09, 19	26.3	-	2.55	5.1	6.2
10, 20	26.3	-	2.55	5.1	6.2

FIGURE 2(b) - STRAIGHT AND 90° PCB TYPES

**Female Coaxial Contact  
(Male Centre Contact)**



**Male Coaxial Contact  
(Female Centre Contact)**



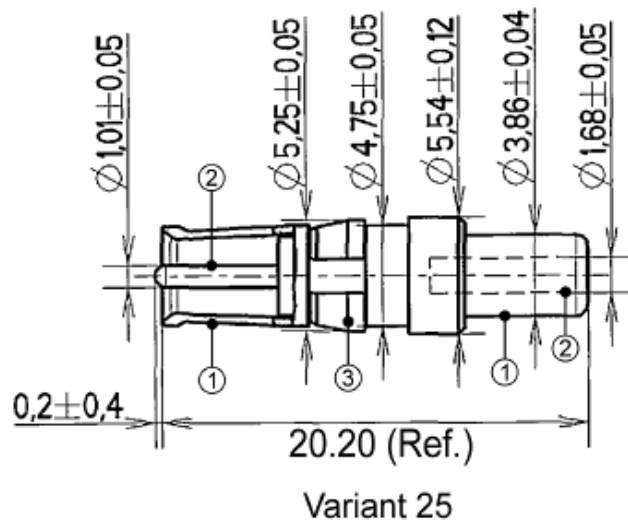
**NOTES:**

1. Outer contact.
2. Centre contact.
3. Ring.
4. All dimensions are in millimetres.
5. Variants 23 and 24 are applicable to shell sizes E, A, B and C only.
6. Lettered dimensions shall be as follows:

Variant	Dimensions (mm)				
	B Ref.	C Ref.	D Ref.	E Ref.	ØY Max.
21, 22	17.9	-	5	-	0.9
23, 24	20.7	11.2	5	3.7	0.9

FIGURE 2(c) - SAVERS TYPE

Male and Female Centre Contact

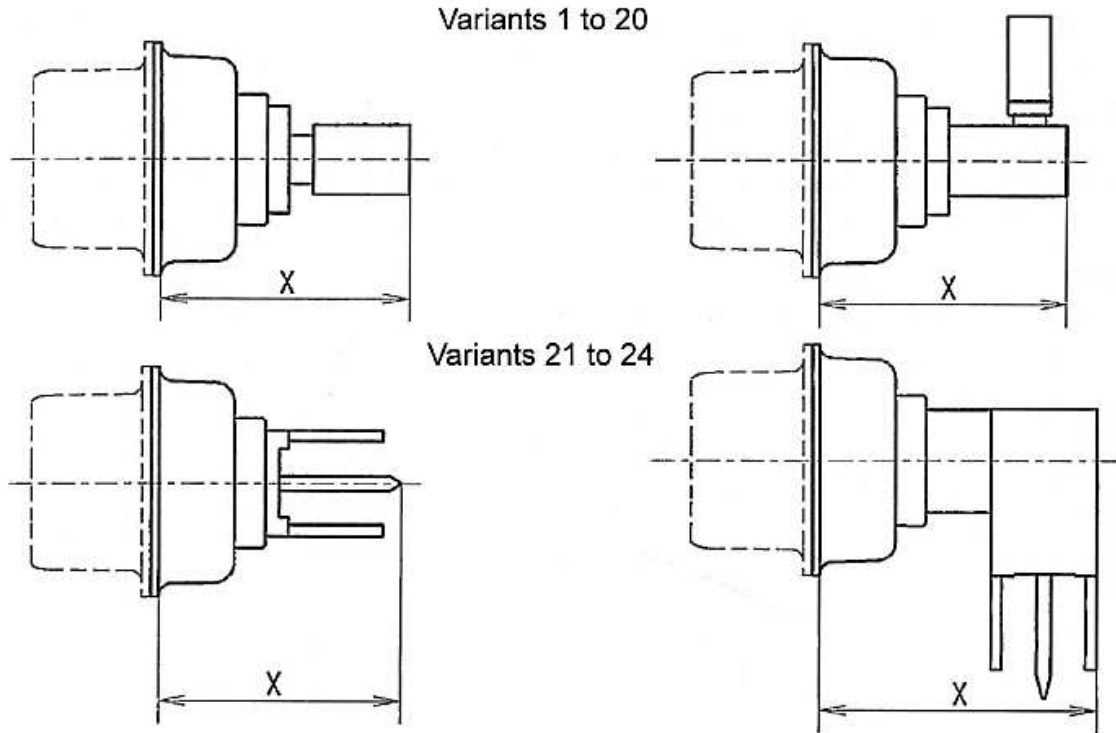


**NOTES:**

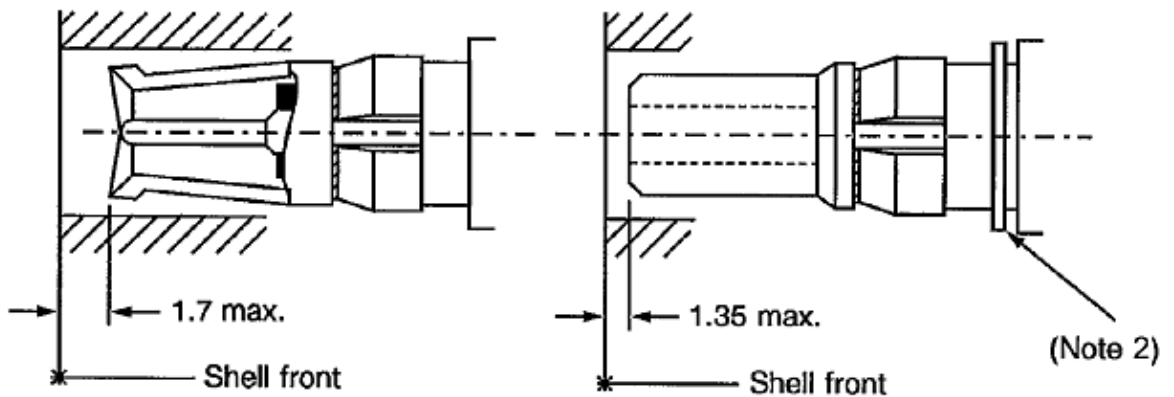
1. Outer contact.
2. Centre contact.
3. Ring.
4. All dimensions are in millimetres.

**FIGURE 2(d) - PROTRUSION AND RECESS**

Maximum Protrusion of Contacts Relative to Rear of Shell Flange



Maximum Recess of Contacts Relative to Front of Shell



**NOTES:**

1. All dimensions are in millimetres.
2. The washer is optional (no change of the insert: the assembling dimension is compensated on the contact).
3. Dimension X shall be as follows:

Variant	Dimension X Max. (mm)
01, 02, 05, 06, 11, 12, 15, 16	18.8
03, 04, 07, 08, 13, 14, 17, 18	13.46
09, 10, 19, 20	21.5
21, 22	13
23, 24	15

**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. 3401/001, Connectors, Electrical, Rectangular, Non-removable Solder Bucket, PCB and Wire-wrap Contacts and Removable Coaxial and Power Contacts, Based on Type D\*M.
- (c) ESCC Detail Specification No. 3401/080, Connector Savers, Electrical, Rectangular, Miniature, Non-Removable Signal Contacts, and Removable Coaxial and Power Contacts.
- (d) ESCC Generic Specification No. 3402, Connectors, RF Coaxial.
- (e) ESCC Detail Specification No. 3902/001, Coaxial, Double Shielded Coaxial, Shielded and Jacketed Coaxial Cables, Flexible, 50Ω, Miniature, PTFE Dielectric, Based on Type 50 CIS.
- (f) MIL-DTL-17, General Specification for Cables, Radio Frequency, Flexible and Semi-rigid.
- (g) NFC 93550, Câbles Coaxiaux, HF Sous Tresse Métallique: Prescriptions Générales.

**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 contacts specified herein are stated in this specification and ESCC Generic Specification No. 3401. Deviations from the Generic Specification, applicable to this specification only, are detailed 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)

None.

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. 9.29, Oversize Pin Exclusion: Not applicable.
- (b) Para. 9.30, Probe Damage: Not applicable.
- (c) Para. 9.31, Solderability: Not applicable to Variants 11 to 20 and 25.
- (d) Para. 9.15, Joint Strength: The test shall be performed as specified in Para. 4.3.13.

4.2.5 Deviations from Lot Acceptance Tests (Chart V)

The deviations as listed in Para. 4.2.4 shall apply.

4.3 MECHANICAL REQUIREMENTS

4.3.1 Dimension Check

The dimensions of the contacts specified herein shall be verified in accordance with the requirements set out in Para. 9.6 of ESCC Generic Specification No. 3401 and they shall conform to those shown in Figure 2 of this specification. Overall dimensions are specified with compatible inserts in ESCC Detail Specification No. 3401/001 and 3401/080.

4.3.2 Weight

The maximum weight of the contacts specified herein shall be as given 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.

4.3.3.1 *Outer Contacts (Variants 02, 04, 06, 08, 10, 12, 14, 16, 18, 20, 22, 24)*

	Pick-Up Weight	Drop Weight
Weight (g)	85	700
Pin Diameter (mm)	3.857 - 3.862	3.857 - 3.862
Insertion Depth (mm)	4	4

4.3.3.2 *Centre Contacts (Variants 01, 03, 05, 07, 09, 11, 13, 15, 17, 19, 21, 23)*

	Pick-Up Weight	Drop Weight
Weight (g)	28.35	226.8
Pin Diameter (mm)	0.99 – 0.993	1.039 – 1.042
Insertion Depth (mm)	4	4

4.3.4 Contact Retention (in Insert)

Contact retention within the insert shall be 40.86N. There shall be no displacement of the contact in excess of 0.3mm.



4.3.5 Mating and Unmating Forces  
As specified in ESCC Detail Specification No. 3401/001.

4.3.6 Insert Retention (in Shell)  
As specified in ESCC Detail Specification No. 3401/001.

4.3.7 Jackscrew Retention  
Not applicable.

4.3.8 Contact Insertion and Withdrawal Forces  
The contact insertion and withdrawal forces shall be 65N maximum.

4.3.9 Engagement and Separation Forces  
The engagement and separation forces shall be as follows.

4.3.9.1 Outer Contacts (Variants 02, 04, 06, 08, 10, 12, 14, 16, 18, 20, 22, 24)

Test Pin Diameter (mm)	Engagement (N)		Separation (N)	
	Min.	Max.	Min.	Max.
3.857 - 3.862	-	6.87	0.83	-

4.3.9.2 Centre Contacts (Variants 01, 03, 05, 07, 09, 11, 13, 15, 17, 19, 21, 23)

Test Pin Diameter (mm)	Engagement (N)		Separation (N)	
	Min.	Max.	Min.	Max.
0.99 - 0.993	-	-	0.28	-
1.039 - 1.042	-	3.33	-	2.22

4.3.10 Oversize Pin Exclusion  
Not applicable.

4.3.11 Probe Damage  
Not applicable.

4.3.12 Solderability  
Not applicable to Variants 11 to 20 and 25. For all other Variants soldering iron bit size A shall be used.

4.3.13 Joint Strength (Variants 11 to 20)

- (a) The contact shall be assembled to a suitable test cable as specified in Table 1(a).
- (b) Testing shall be performed in accordance with ESCC Generic Specification No. 3401 Para. 9.15.5 with electrical continuity of the 2 contacts being monitored during testing. A force of 40N minimum shall be applied during testing.
- (c) On completion of the testing Low Level Contact Resistance shall be measured and shall not exceed the limits specified in Table 6.



#### 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 contacts 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 Contact Body

The contacts shall be made of copper base alloy selected from raw materials with a minimum of impurities. Gold plating thickness shall be 1.27 $\mu$ m minimum over 1 $\mu$ m minimum of copper.

##### 4.4.2 Insert

Teflon, unpigmented.

##### 4.4.3 Magnetism Level

As specified in ESCC Detail Specification No. 3401/001.

#### 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. These components being too small to accommodate the marking specified hereafter, the full marking information shall accompany the component in its primary package.

Such marking shall comprise:

- (a) The ESCC Component Number.
- (b) Traceability Information.
- (c) Quantity of Components.

##### 4.5.2 The ESCC Component Number

The ESCC Component Number shall be constituted and marked as follows:

Example: 340100401B

- Detail Specification Number: 3401004
- Type Variant (See Table 1(a)): 01
- Testing Level: B

##### 4.5.3 Traceability Information

Traceability information shall be marked in accordance with 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  $T_{amb} = +22 \pm 3$  °C.

##### 4.6.2 Electrical Measurements at High and Low Temperatures (Table 3)

Not applicable.

4.6.3 Circuits for Electrical Measurements  
Not applicable.

4.7 SCREENING TESTS (TABLES 4 AND 5)  
Not applicable.

**TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE**

No.	Characteristics	Symbol	ESCC 3401 Test Method	Test Conditions	Limits		Unit
					Min	Max	
1	Low Level Contact Resistance	R <sub>CL</sub>	Para. 9.1.1.3	Para. 9.1.1.3 Test both centre and outer contacts	-	8.5	mΩ
2	Rated Current Contact Resistance	R <sub>CR</sub>	Para. 9.1.1.3	Para. 9.1.1.3 Test both centre and outer contacts	-	7	mΩ
3	Voltage Proof (Straight Rear-end Contacts)	V <sub>P</sub>	Para. 9.1.1.2	Between centre and outer contact	1000	-	V <sub>rms</sub>
4	Voltage Proof (90° Rear-end Contacts)	V <sub>P</sub>	Para. 9.1.1.2	Between centre and outer contact	800	-	V <sub>rms</sub>

**TABLES 3, 4 AND 5**

Not applicable.

4.8 ENVIRONMENTAL AND ENDURANCE TESTS

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 tests are scheduled in Table 6. Unless otherwise specified, the measurements shall be performed at T<sub>amb</sub>=+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 tests shall be those specified in Table 6. Unless otherwise specified, these measurements shall be performed at T<sub>amb</sub> = +22 ±3 °C.

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

4.8.5 Electrical Circuit 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 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 Methods and Conditions	Identification	Conditions		Min	Max	
01	Wiring	Para. 9.10	Visual Examination Low Level Contact Resistance	- Table 2 Item 1	- R <sub>CL</sub>	- -	- 8.5	- mΩ
02	Vibration	Para. 9.11	ESCC 3401/001	-	-	-	-	-
03	Shock or Bump	Para. 9.12	ESCC 3401/001	-	-	-	-	-
04	Climatic Sequence (Low Air Pressure Only)	Para. 9.13.5	<b>Low Air Pressure:</b> Voltage Proof at Simulated Altitude <b>Final Inspection</b> Visual Examination <b>Final Measurement</b> Voltage Proof	Table 2 Items 3 & 4 at 33000m  - Table 2 Items 3 & 4	V <sub>P</sub>  - V <sub>P</sub>	See Figure 1  -   - Table 2, Items 3 & 4		-  - -
05	Seal Test	Para. 9.9	Not applicable	-	-	-	-	-
06	Plating Thickness	Para. 9.14 & Para. 4.4.1 of this Spec.	Thickness	Para. 4.4.1	-	Para. 4.4.1.		-
07	Joint Strength	Para. 9.15 & Para. 4.3.13 of this Spec.	Visual Examination Low Level Contact Resistance	- Table 2 Item 1	- R <sub>CL</sub>	- -	- 8.5	- mΩ
08	Rapid Change of Temperature	Para. 9.16	Visual Examination Voltage Proof	- Table 2 Items 3 & 4	- V <sub>P</sub>	-	-	- -
09	Contact Retention (in Insert)	Para. 9.17 & Para. 4.3.4 of this spec. Force: 40.86N	Contact Displacement	Para. 4.3.4	-	Para. 4.3.4		-

No.	ESCC Generic Spec. No. 3401		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests (1)	Test Methods and Conditions	Identification	Conditions		Min	Max	
10	Endurance	Para. 9.18	<b>Initial Measurement</b>	Table 2 Item 1	R <sub>CL</sub>	-	8.5	mΩ
			Low Level Contact Resistance					
			<b>Final Inspection</b>	-	-	-	-	
			<b>Final Measurement</b>	Table 2 Item 1	ΔR <sub>CL</sub>	-	2	mΩ
			Voltage Proof	Table 2 Items 3 & 4	V <sub>P</sub>	Table 2, Items 3 & 4		-
11	Permanence of Marking	Para. 9.19	As applicable	-	-	-	-	-
12	Mating/Unmating Forces	Para. 9.20	ESCC 3401/001	-	-	-	-	-
13	High Temperature Storage	Para. 9.21	<b>Initial</b>	Table 2 Item 1	R <sub>CL</sub>	-	8.5	mΩ
			Low Level Contact Resistance					
			<b>Final Inspection</b>	-	-	-	-	
			<b>Final Measurement</b>	Table 2 Item 1	ΔR <sub>CL</sub>	-	2	mΩ
			Rated Current Contact Resistance	Table 2 Item 2	R <sub>CR</sub>	-	7	mΩ
			Contact Retention (in Insert)	Para. 4.3.4 of this spec.	-	Para. 4.3.4		-
14	Corrosion	Para. 9.22	ESCC 3401/001	-	-	-	-	-
15	Insert Retention (in Shell)	Para. 9.23	ESCC 3401/001	-	-	-	-	-
16	Jackscrew Retention	Para. 9.24	Not applicable	-	-	-	-	-
17	High Temperature Measurements	Para. 9.25	ESCC 3401/001	-	-	-	-	-

No.	ESCC Generic Spec. No. 3401		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests (1)	Test Methods and Conditions	Identification	Conditions		Min	Max	
18	Overload Test	Para. 9.26	Rated Current Contact Resistance	Table 2 item 2	R <sub>CR</sub>	-	7	mΩ
			Voltage Proof	Table 2 Items 3 & 4	V <sub>P</sub>	Table 2, Items 3 & 4		-
19	Maintenance Aging	Para. 9.27	<b>Final Measurements</b>		-	-	-	-
			Contact Retention (in Insert)	Para. 4.3.4 of this spec.	-	Para. 4.3.4		-
			Contact Insertion & Withdrawal Forces	Para. 4.3.8 of this spec.	-	Para. 4.3.8		-
20	Engagement and Separation Forces	Para. 9.28 & Para. 4.3.9 of this spec.	Force	-	-	Para. 4.3.9		-
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.	Visual Examination	-	-	-	-	-

**NOTES:**

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