CONTACTS, ELECTRICAL, TRIAX, CRIMP FOR 3401/066

CONNECTORS

ESCC Detail Specification No. 3401/066

Issue 3	April 2008

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

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DCR No.	CHANGE DESCRIPTION
362	Specification upissued to incorporate technical and editorial 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 Contacts, Electrical, Triax, Crimp for 3401/056 Connectors. The crimps on inner, intermediate and outer contacts shall be made at equidistant points around the circumference of the contacts.

These contacts shall be procured and packed separately from the connectors.

The specification shall be read in conjunction with:

– ESCC Generic Specification No. 3401, Connectors, Electrical, Non-Filtered, Circular and Rectangular.
– ESCC Detail Specification No. 3401/056, Connectors, Electrical, Circular, Triple-Start Self-Locking Coupling, Scoop-Proof, Removable Crimp Contacts, based on MIL-C-38999 Series III.

the requirements of which are supplemented herein.

1.2 COMPONENT TYPE VARIANTS

Variants of the basic type of contacts specified herein, which are also covered by this specification are scheduled 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 as scheduled in Table 1(b).

1.4 PARAMETER DERATING INFORMATION

The applicable derating information for 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.

1.6 FUNCTIONAL DIAGRAM

Not applicable.

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. 3401/056, Connectors, Electrical, Circular, Triple-Start Self-Locking Coupling, Scoop-Proof, Removable Crimp Contacts, based on MIL-C-38999 Series III.
(c) MIL-C-17/176, Cables, Radio Frequency, Flexible, Twin.
(d) SSQ21655, Cable, Electric, MIL-STD-1553 Data Bus, Space Quality, General Specification for.

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) - TYPE VARIANTS

Variant	Contact Type	Sealing Sleeve Type	Max. Weight (g) (Note 3)	Accepted Cables	Remarks
01	Male	No Sleeve (Code 0)	4.6	M17-176-00002 SSQ-21655 (NDBC-TFE-2452SJ-75-1P512296-C)	Note 1
		Straight (Code 1)	6.6		Note 2
		Elbow (Code 2)	6.6		Note 2
02	Female	No Sleeve (Code 0)	7.2		Note 1
		Straight (Code 1)	9.2		Note 2
		Elbow (Code 2)	9.2		Note 2

NOTES:

1. Contacts fitted in 09-01 arrangement shall be used only with backshells ESCC No. 3401/062, Variants 65 to 67 without sealing sleeves.
2. Contacts fitted in other triax arrangements shall be used only with backshells ESCC No. 3401/062, variants 41 to 45 with straight sealing sleeves or with backshells ESCC No. 3401/062, Variants 50 to 54 with elbow sealing sleeves.
3. Weight includes the weight of both the contact and the sealing sleeve as applicable.

TABLE 1(b) - MAXIMUM RATINGS

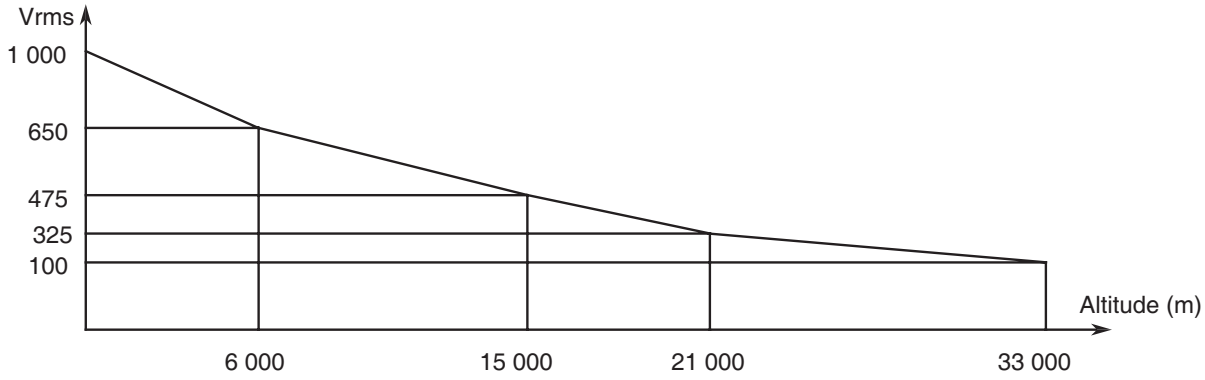
No.	Characteristics	Symbol	Maximum Rating	Unit	Remarks
1	Working Voltage Sea Level	U_R	500	V	
2	Rated Current	Icr	1	A	
3	Frequency Range	f	0 to 20	MHz	Note 1
4	Operating Temperature Range	T_{op}	-65 to +200	˚C	
5	Storage Temperature Range	T_{stg}	-65 to +200	˚C	

NOTES:

1. Compatible with 1553 Bus Line.

FIGURE 1- PARAMETER DERATING INFORMATION
Voltage Proof Versus Altitude

(Inner/Intermediate)



(Intermediate/Outer)

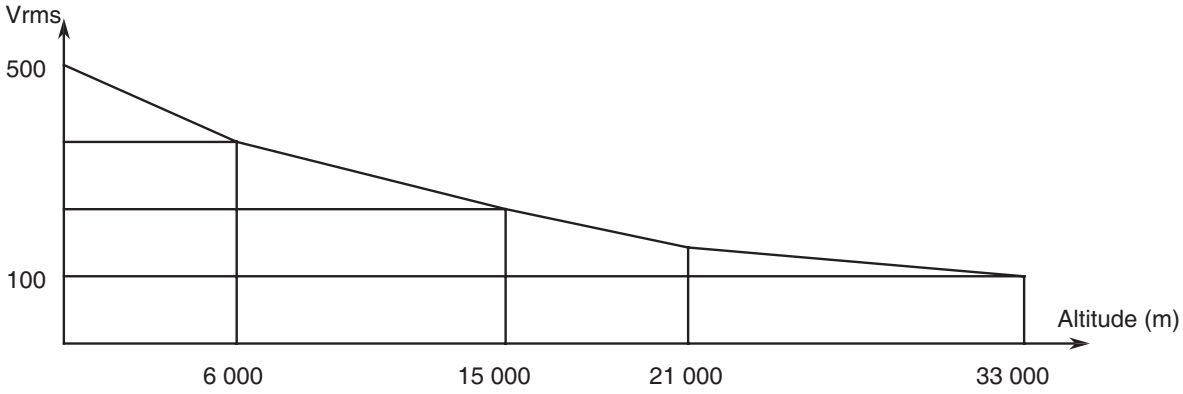
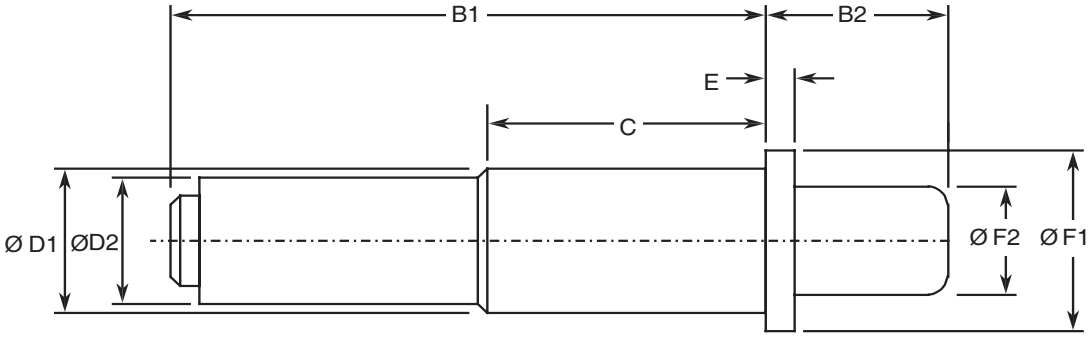


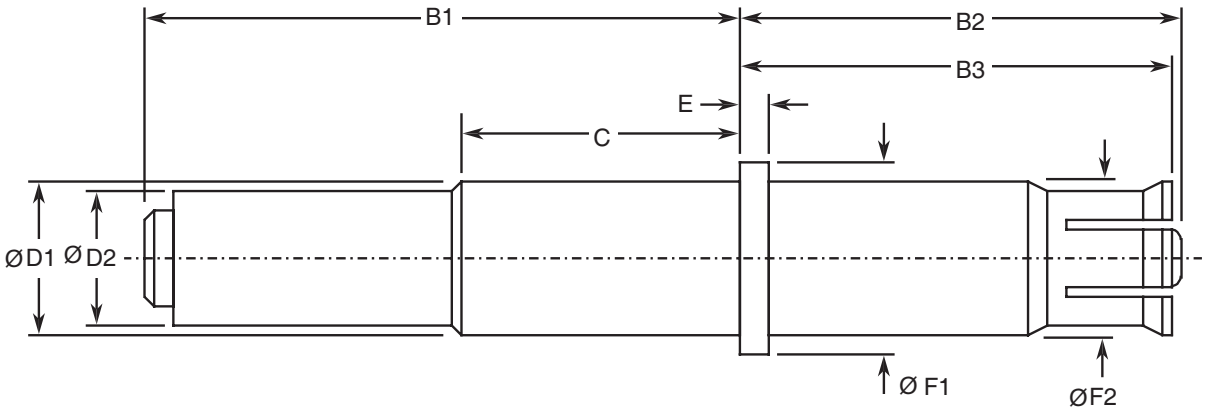
FIGURE 2 - PHYSICAL DIMENSIONS
FIGURE 2(a) - CONTACTS

Variant 01 - Male Contact



Symbol	Millimetres		Remarks
	Min.	Max.	
B1	21.34	22.86	
B2	7.49	7.74	
C	10	11	
ØD1	6.93	7.01	
ØD2	-	6.53	After crimping
E	0.74	0.84	
ØF1	7.95	8.03	
ØF2	5.515	5.565	

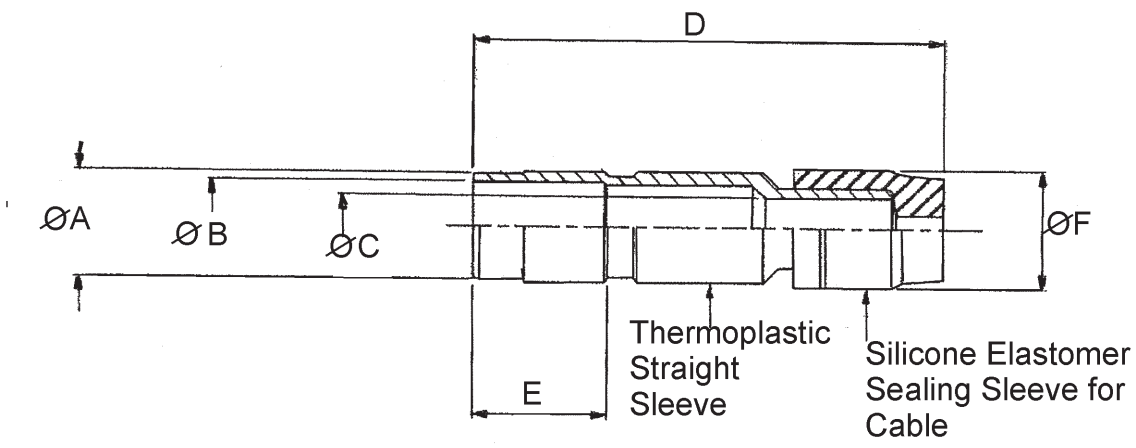
Variant 02 - Female Contact



Symbol	Millimetres		Remarks
	Min.	Max.	
B1	21.34	22.86	

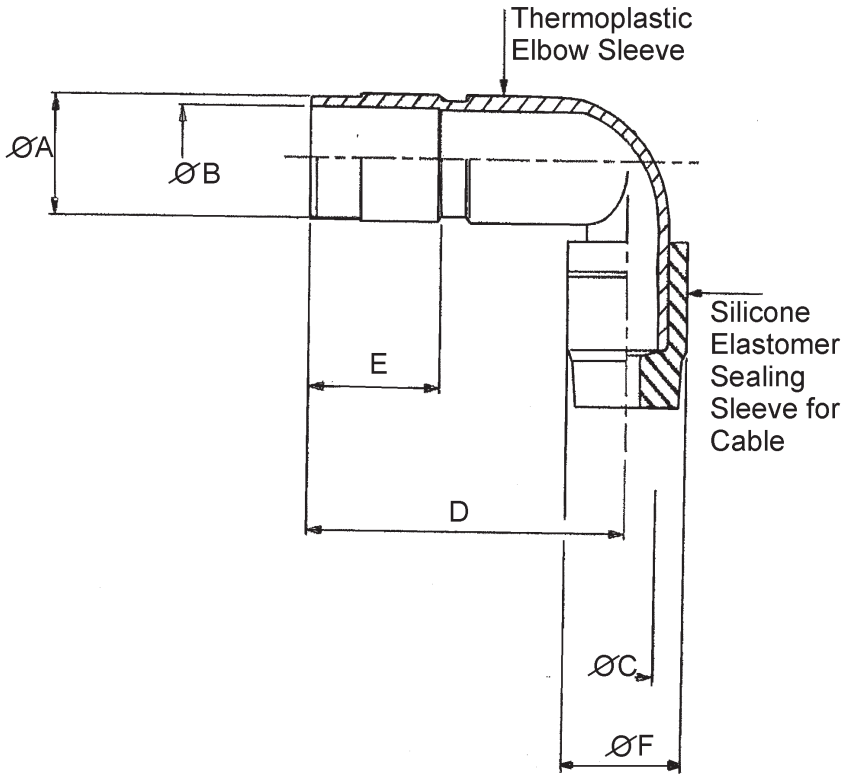
Symbol	Millimetres		Remarks
	Min.	Max.	
B2	15.8	16.43	
B3	15.88	16.03	
C	10	11	
ØD1	6.93	7.01	
ØD2	-	6.53	After crimping
E	0.74	0.84	
ØF1	7.95	8 03	
ØF2	7.22	7.32	

FIGURE 2(b) - SEALING SLEEVES
Straight Sleeve (Code 1)



Symbol	Millimetres		Remarks
	Min.	Max.	
ØA	8.3	8.4	
ØB	7.05	7.15	
ØC	4.8	4.9	
D	35.4	36.5	
E	10.3	10.5	
ØF	9.2	9.5	

Elbow Sleeve (Code 2)



Symbol	Millimetres		Remarks
	Min.	Max.	
ØA	8.3	8.4	
ØB	7.05	7.15	
ØC	4.8	4.9	
D	25	25.2	
E	10.3	10.5	
ØF	9.2	9.5	

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)

Not applicable.

4.2.4 Deviations from Qualification Tests (Chart IV)

(a) Para. 9.15, Joint Strength: Shall be performed as specified in Para. 4.3.13 of this specification.
(b) Para. 9.26, Overload Test: Not applicable.
(c) Para. 9.29, Oversize Pin Exclusion: Not applicable.
(d) Para. 9.30, Probe Damage: Not applicable.
(e) Para. 9.31, Solderability: Not applicable.

4.2.5 Deviations from Lot Acceptance Tests (Chart V)

(a) Para. 9.15, Joint Strength: Shall be performed as specified in Para. 4.3.13 of this specification.
(b) Para. 9.29, Oversize Pin Exclusion: Not applicable.
(c) Para. 9.30, Probe Damage: Not applicable.

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.

4.3.2 Weight

The maximum weight of the contacts specified herein, including sealing sleeve if applicable, 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 Inner Contact

	Pick-Up Weight	Drop Weight	Units
Weight	11	180	g
Pin Diameter	0.594 to 0.596	0.619 to 0.622	mm

	Pick-Up Weight	Drop Weight	Units
Insertion Depth	3.0	3.0	mm

4.3.3.2 Intermediate Contact

	Pick-Up Weight	Drop Weight	Units
Weight	11	350	g
Pin Diameter	2.844 to 2.847	2.887 to 2.895	mm
Insertion Depth	3.0	3.0	mm

4.3.3.3 Outer Contact

	Pick-Up Weight	Drop Weight	Units
Weight	56	450	g
Pin Diameter	5.511 to 5.514	5.559 to 5.562	mm
Insertion Depth	4.0	4.0	mm

4.3.4 Contact Retention (in Insert)

The contact retention within the insert shall be 111N. 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. 3401/056.

4.3.6 Insert Retention (in Shell)

As specified in ESCC Detail Specification No. 3401/056.

4.3.7 Jackscrew Retention

Not applicable.

4.3.8 Contact Insertion and Withdrawal Forces

Insertion and withdrawal forces of the contacts shall be as specified in ESCC Detail Specification No. 3401/058 for size 8 contacts.

Not applicable to arrangement 09-01.

4.3.9 Engagement and Separation Forces

4.3.9.1 Inner Contact

The contact engagement and separation forces shall be as follows.

Test Pin Diameter (mm)	Engagement Maximum (g)	Separation Minimum (g)
0.594 to 0.596	-	11
0.619 to 0.622	396	-

4.3.9.2 Intermediate Contact

The contact engagement and separation forces shall be as follows.

Test Pin Diameter (mm)	Engagement Maximum (g)	Separation Minimum (g)
2.844 to 2.847	-	11
2.887 to 2.895	623	-

4.3.9.3 Outer Contact

The contact engagement and separation forces shall be as follows.

Test Pin Diameter (mm)	Engagement Maximum (g)	Separation Minimum (g)
5.511 to 5.514	-	56
5.559 to 5.562	1700	-

4.3.10 Oversize Pin Exclusion

Not applicable.

4.3.11 Probe Damage Test

Not applicable.

4.3.12 Solderability

Not applicable.

4.3.13 Joint Strength

(a) The contact shall be assembled to its test cable as specified in Table 1(a) with a thermoshrink sleeve between cable and back shell.
(b) Testing shall be performed in accordance with ESCC Generic Specification No. 3401, Para. 9.15.5 with electrical continuity of the 3 contacts being maintained during testing.
(c) On completion of the testing, Contact Resistance at Low Level shall be measured and shall not exceed the values specified in Table 6 of this specification.

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 Inserts

Teflon.

4.4.2 Inner, Intermediate and Outer Contacts

The contact body shall be made of copper base alloy selected from raw materials with a minimum of impurities. The contacts shall be plated as follows:

– 2.0µm±20% nickel underplate.
– 1.27µm minimum gold plate over 3µm minimum of copper.

4.4.3 Sealing Sleeve

Silicone elastomer and thermoplastic.

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, the marking requirements, in full, 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:

340106601B0

- Detail Specification Number: 3401066
- Type Variant (See Table 1(a)): 01
- Testing Level: B
- Sealing Sleeve Code (see Para. 4.5.2.1): 0

4.5.2.1 Sealing Sleeve Code

The sealing sleeve code to be marked as part of the ESCC Component Number shall be as follows:

Code 0 indicates contacts supplied without sealing sleeves.
Code 1 indicates contacts supplied with straight sealing sleeves.
Code 2 indicates contacts supplied with elbow sealing sleeves.

4.5.3 Traceability Information

Each component shall be marked in respect of traceability information 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 at room temperature are scheduled in Table 2. Unless otherwise specified, measurements shall be performed at T_{amb}=+22±3˚C.

Contact resistance shall be measured on the engaged outer, intermediate and inner conductor contacts.

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

Not applicable.

4.6.3 Circuits for Electrical Measurements

A circuit for measuring Contact Resistance is shown in Figure 4 of this specification.

4.7 SCREENING TESTS (TABLES 4 AND 5)

Not applicable.

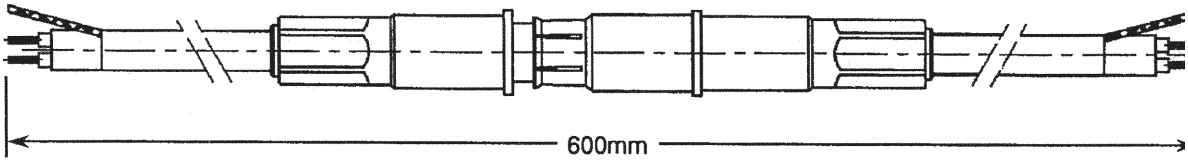
TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE

No.	Characteristics	Symbol	ESCC 3401 Test Method	Test Conditions	Limits		Unit
					Min	Max	
1	Insulation Resistance (Inner, Intermediate and Outer Contacts)	Ri	Para 9.1.1.1	Para. 9.1.1.1	5000	-	MΩ
2	Voltage Proof Leakage Current 1 (Inner to Intermediate Contact)	I_{L1}	Para 9.1.1.2	Para. 9.1.1.2 VP = 1000Vrms	-	2	mA
3	Voltage Proof Leakage Current 2 (Intermediate to Outer Contact)	I_{L2}	Para 9.1.1.2	Para. 9.1.1.2 VP = 500Vrms	-	2	mA
4	Contact Resistance (Low Level Current) (Inner and Intermediate Contacts) (Outer Contact)	Rcl	Para. 9.1.1.3	Para. 9.1.1.3 and Figure 4 100mA	 - -	 8.5 2	mΩ
5	Contact Resistance (Rated Current)	Rcr	Para. 9.1.1.3	Para. 9.1.1.3 and Figure 4 1.0A	-	8.5	mΩ

TABLES 3, 4 AND 5

Not applicable.

FIGURE 4 - TEST CIRCUIT FOR CONTACT RESISTANCE MEASUREMENTS



1. Contact Resistance shall be measured at the distance specified above and shall be calculated as the difference between this value and the pre-measured value of the cable used, i.e.:

   Rc = Rt - Rw.

   Where

   Rc = Contact resistance.

   Rt = Total measured resistance.

   Rw = Total wire resistance.

2. The current shall be applied for an average of 5 seconds in both directions and the resulting values shall be averaged to obtain the measured value.

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 tests are scheduled in Table 6. Unless otherwise stated, 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 tests are scheduled in Table 6. Unless otherwise stated, the measurements shall be performed at T_{amb}=+22±3˚C.

4.8.4 Conditions for Operating Life Tests

Not applicable.

4.8.5 Electrical Circuit for Operating Life Tests (Figure 5)

Not applicable.

4.8.6 Conditions for High Temperature Storage Test (Part of Endurance Testing)

Not applicable.

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	Seal Test	Para. 9.9	-	-	-	-	-	-
02	Wiring	Para. 9.10 & Table 1(a) of this spec.	Visual Inspection	-	-	-	-	-
			Low Level Contact Resistance	Table 2 Item 4	Rcl	Table 2 Item 4		-
03	Vibration	Para. 9.11	ESCC 3401/056	-	-	-	-	-
04	Shock or Bump	Para. 9.12	ESCC 3401/056	-	-	-	-	-
05	Climatic Sequence	Para. 9.13	ESCC 3401/056	-	-	-	-	-
06	Plating Thickness	Para. 9.14	Thickness	-	-	Para. 4.4.2 of this spec.		-
07	Joint Strength	Para. 9.15 and Paras. 4.2.4 and 4.2.5 of this spec.	Para. 4.3.13 of this spec.	Force = 50 N (Min.)	-	Continuity		-
			Final Measurements					
			Low Level Contact Resistance	Table 2 Item 4	Rcl	Table 2 Item 4		-
08	Rapid Change of Temperature	Para. 9.16	ESCC 3401/001	-	-	-	-	-
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**					
			Low Level Contact Resistance	Table 2 Item 4	Rcl	Record Values		-
			Final Measurements					
			Insulation Resistance	Table 2 Item 1	Ri	Table 2 Item 1		
			Voltage Proof Leak Current	Table 2 Item 2	I_{L1}	-	2	mA
			Voltage Proof Leak Current	Table 2 Item 3	I_{L2}	-	2	mA
			Low Level Contact Resistance Drift	Table 2 Item 4	ΔRcl	-20	±20	%
11	Permanence of Marking	Para. 9.19	Not applicable	-	-	-	-	-
12	Mating/Unmating Forces	Para. 9.20	ESCC 3401/056	-	-	-	-	-
13	High Temperature Storage	Para. 9.21	**Initial Measurements**					
			Low Level Contact Resistance	Table 2 Item 4	Rcl	Record Values		-
			Final Measurements					
			Insulation Resistance	Table 2 Item 1	Ri	Table 2 Item 1		
			Voltage Proof Leak Current	Table 2 Item 2	I_{L1}	-	2	mA

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	
			Voltage Proof Leak Current	Table 2 Item 3	I_{L2}	-	2	mA
			Low Level Contact Resistance Drift	Table 2 Item 4	ΔRcl	-20	+20	%
			Rated Current Contact Resistance	Table 2 Item 5	Rcr	-	11	mΩ
			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.	ESCC 3401/056	-	-	-	-	-
16	Jackscrew Retention	Para. 9.24 & Para. 4.3.7 of this spec.	Not applicable	-	-	Not applicable		-
17	High Temperature Measurements	Para. 9.25	ESCC 3401/056	-	-	-	-	-
18	Overload Test	Para. 9.26 & Para. 4.2.4 of this spec.	Not applicable	-	-	-	-	-
19	Maintenance Aging	Para. 9.27	Visual Examination	-	-	-	-	-
			Contact Retention (in Insert)	Para. 4.3.4 of this spec.	-	ESCC 3401 Para. 9.17		
			Contact Insertion & Withdrawal Forces	Para. 4.3.8 of this spec.	-	Para. 4.3.8 of this spec		
20	Engagement and 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. 4.2.4 & 4.2.5 of this spec.	Not applicable	-	-	-	-	-
22	Probe Damage	Para. 9.30 & para. 4.2.4 & 4.2.5 of this spec.	Not applicable	_	-	-	-	-
23	Solderability	Para. 9.31 & para. 4.2.4 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.