



**european space agency  
agence spatiale européenne**

Pages 1 to 20

**CONNECTOR SAVERS, ELECTRICAL,  
RECTANGULAR, MICROMINIATURE,  
BASED ON TYPE MDM**

**ESA/SCC Detail Specification No. 3401/041**



**space components  
coordination group**

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		SCCG Chairman	ESA Director General or his Deputy
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**DOCUMENTATION CHANGE NOTICE**

Rev. Letter	Rev. Date	Reference	CHANGE Item	Approved DCR No.
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		Para. 4.4.6	: New para. inserted	221665
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			: No. 19, "Test Method", "Identification" and "Conditions" amended	221665

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**APPENDICES (Applicable to specific Manufacturers only)**

None.

**1. GENERAL****1.1 SCOPE**

This specification details the ratings, physical and electrical characteristics, test and inspection data of 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) ESA/SCC Generic Specification No. 3401, Connectors, Electrical, Rectangular and Circular.
- (b) ESA/SCC Detail Specification No. 3401/032, Accessories for Connectors, Microminiature, 3401/029, and Connector Savers No. 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 contacts specified herein, are scheduled 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 dimensions of the connectors, insulated wires and uninsulated solid wires specified herein are shown in Figure 2.

**1.6 CONTACT ARRANGEMENTS**

Contact arrangement 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) ESA/SCC Generic Specification No. 3401, Connectors, Electrical, Circular and Rectangular.
- (b) ESA/SCC Detail Specification No. 3401/032, Accessories for Connectors, Microminiature for 3401/029, and Connector Savers No. 3401/041.
- (c) QQ-W-343, Wires, Electrical Uninsulated.
- (d) MIL-G-45204, Gold Plating, Electro-deposited.
- (e) MIL-C-14550, Copper Plating, Electro-deposited.
- (f) MIL-PRF-83513, Connectors Electrical, Rectangular, Microminiature, Polarised Shell, Generic Specification for.

**3. TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS**

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

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

VARIANT	SHELL SIZE Note 1	MAX. WEIGHT (g) Note 2	MAX. ENGAGEMENT FORCE (N)	SEPARATION FORCE (N)	
				MAX	MIN
01	9 PS	4.0	20	20	1.3
02	15 PS	5.5	33	33	2.0
03	21 PS	7.0	47	47	2.9
04	25 PS	8.0	55	55	3.5
05	31 PS	9.5	69	69	4.3
06	37 PS	10.0	82	82	5.1
07	51 PS	13.5	113	113	7.1

**NOTES**

1. Connectors are fixed in the connector saver.
2. Connector with contacts and without screw-locks.

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

NO.	CHARACTERISTICS	SYMBOL	MAXIMUM RATING	UNIT	REMARKS
1	Working Voltage Sea Level	$U_R$	150	Vrms	Note 1
2	Rated Current: (uninsulated solid wire)	$I_R$	2.5	A	
3	Operating Temperature Range	$T_{op}$	- 55 to + 125	°C	
4	Storage Temperature Range	$T_{stg}$	- 55 to + 125	°C	

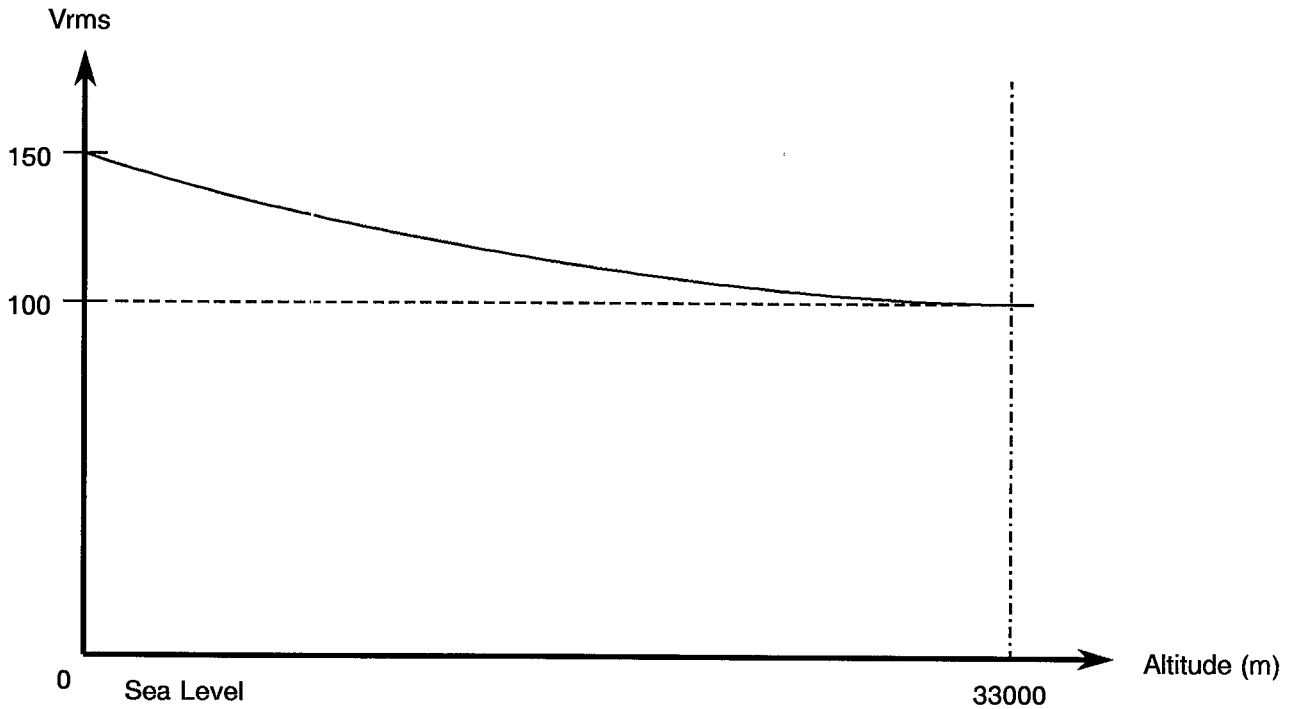
**NOTES**

1. Between contacts, and contact and shell.



**FIGURE 1 - PARAMETER DERATING INFORMATION**

**FIGURE 1(a) - WORKING VOLTAGE VERSUS ALTITUDE**



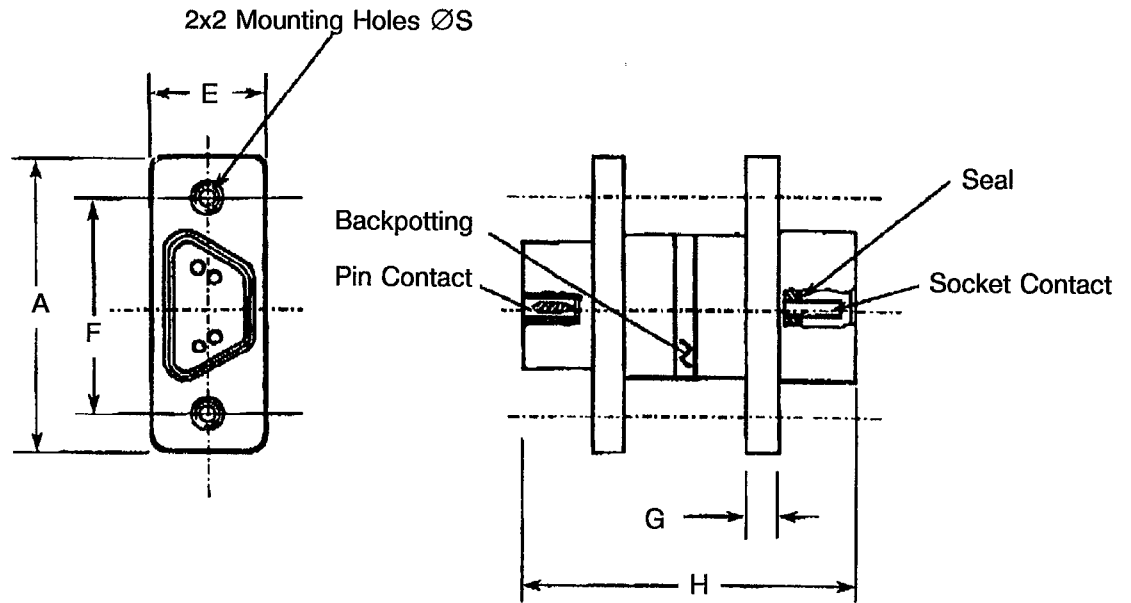
**FIGURE 1(a) - MAXIMUM CURRENT VERSUS NUMBER OF CONTACTS**

NUMBER OF CONTACTS PER CONNECTOR	MAXIMUM CURRENT PER CONTACT
	UNINSULATED SOLID WIRE
2 - 4	2.0
5 - 14	1.8
15 and over	1.4



**FIGURE 2 - PHYSICAL DIMENSIONS**

**FIGURE 2.1 - CONNECTOR SAVER DIMENSIONS**



VARIANT	SIZE	A	E	F	G	H	ØS	
		MAX	MAX	MAX	TYPICAL	TYPICAL	MIN	MAX
01	09PS	19.94	7.75	14.35	2.29	22.86	2.23	2.39
02	15PS	23.75	7.75	18.16	2.29	22.86	2.23	2.39
03	21PS	27.56	7.75	21.97	2.29	22.86	2.23	2.39
04	25PS	30.10	7.75	24.51	2.29	22.86	2.23	2.39
05	31PS	33.91	7.75	28.32	2.29	22.86	2.23	2.39
06	37PS	37.72	7.75	32.13	2.29	22.86	2.23	2.39
07	51PS	36.45	8.76	30.86	2.29	22.86	2.23	2.39

**NOTES**

1. All dimensions are in millimetres.





**FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)**

**FIGURE 2.2 - CONTACT POSITION**

Figure 2.2.1 - Mounting Condition

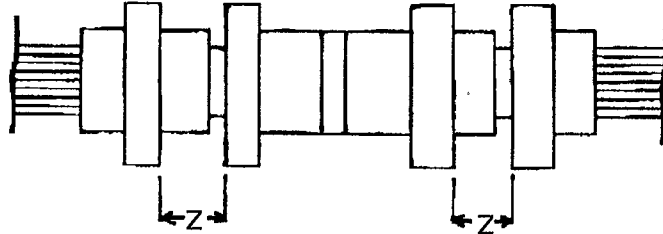


Figure 2.2.2 - Plug Male Contact

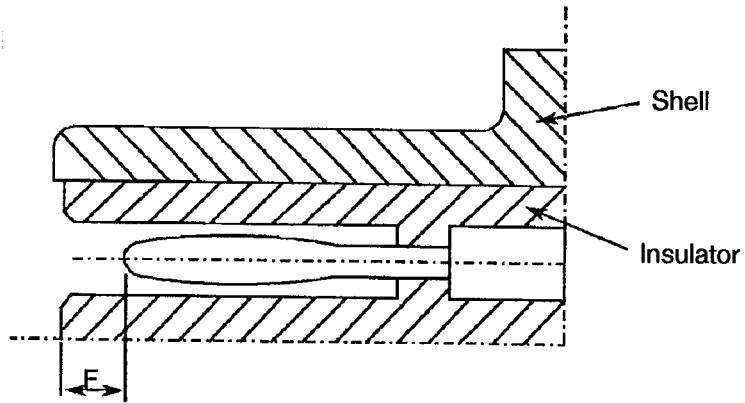
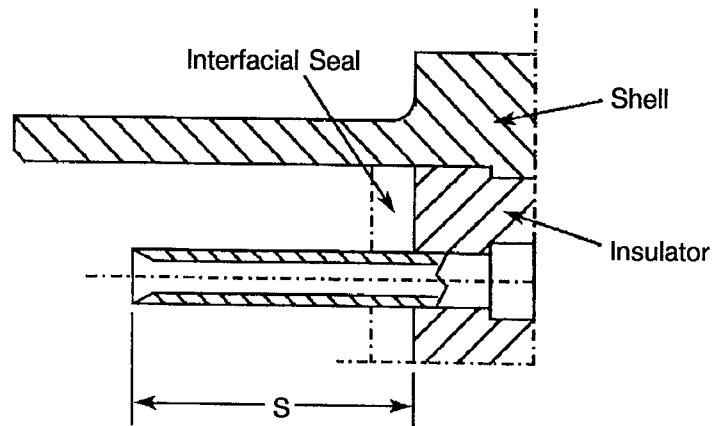


Figure 2.2.3 - Receptacle Female Contact



F		S		Z
MIN	MAX	MIN	MAX	MAX
0.25	0.91	3.30	3.66	5.49

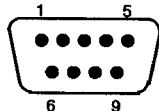
**NOTES**

1. All dimensions are in millimetres.

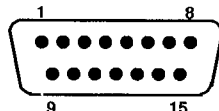


**FIGURE 3 - CONTACT ARRANGEMENTS**

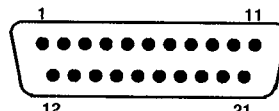
FRONT VIEW OF MALE INSERT - USE MIRROR VIEW FOR FEMALE INSERT



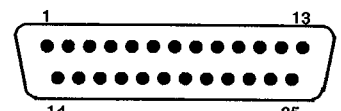
9 CONTACTS



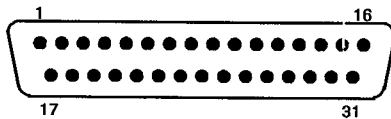
15 CONTACTS



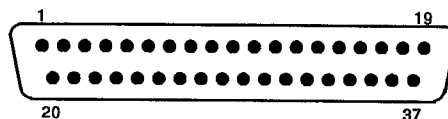
21 CONTACTS



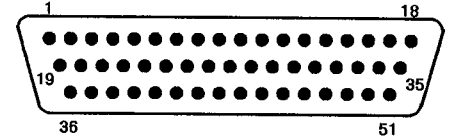
25 CONTACTS



31 CONTACTS



37 CONTACTS

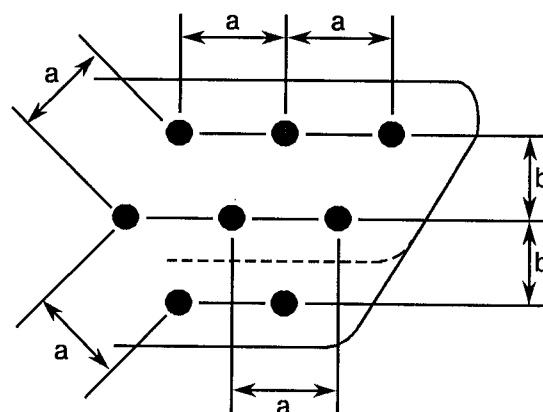


51 CONTACTS

**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 ESA/SCC 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 ESA/SCC 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 Soecial 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
	AWG25 - Solid Uninsulated
Tensile Strength (N)	22

**4.2.2 Deviations from Final Production Tests (Chart II)**

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

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

None.

**4.2.4 Deviations from Qualification Tests (Chart IV)**

- (a) Para. 9.9, Seal Test: Not applicable.
- (b) Para. 9.15, Joint Strength: Not applicable.
- (c) Para. 9.17, Contact Retention (In insert): Not applicable with male contact.
- (d) Para. 9.27, Maintenance Ageing: Not applicable.
- (e) Para. 9.29, Oversize Pin Exclusion: Not applicable.
- (f) Para. 9.30, Probe Damage: Not applicable.

**4.2.5 Deviations from Lot Acceptance Tests (Chart V)**

- (a) Para. 9.9, Seal Test: Not applicable.
- (b) Para. 9.15, Joint Strength: Not applicable.
- (c) Para. 9.17, Contact Retention (In insert): Not applicable with male contact.
- (d) Para. 9.27, Maintenance Ageing: Not applicable.
- (e) Para. 9.29, Oversize Pin Exclusion: Not applicable.
- (f) 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 ESA/SCC 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 as specified in Table 1(a).

**4.3.3 Contact Capability**

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

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 4 for  $\varnothing A$ .

**4.3.4 Contact Retention (In insert)**

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

**4.3.5 Mating and Unmating Forces**

The forces applied for the engagement and separation of the connectors shall conform to the values specified in Table 1(a).

**4.3.6 Insert Retention (In shell)**

Connector inserts shall withstand a pressure of 34.4N/cm<sup>2</sup> applied from the mating side to the rear side.

**4.3.7 Jackscrew Retention**

Not applicable.

**4.3.8 Contact Insertion and Withdrawal Forces**

Not applicable.

**4.3.9 Engagement and Separation Forces (Male Contacts)**

The contact engagement and separation forces of the male contacts shall be tested to a depth of 1.5mm with the applicable test gauge fixtures specified in Figure 4 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**

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 connectors specified herein to meet the performance requirements of this specification shall be used. Acceptance or approval of any constituent material does not guarantee acceptance of the finished product.

**4.4.1 Shells**

Shells shall be made of aluminium alloy. The plating shall be 25.4µm minimum of electroless nickel (Variant 01) or a minimum thickness of 2.54µm of gold over an electroless nickel underlay (Variant 02).

**4.4.2 Inserts**

Inserts shall be made of glass fibre-filled diallylphtalate 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 1.0µm 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.

**4.4.3.2 Male Contacts**

The contact body and the bundle shall be made of copper alloy with an underplate of 1.0µm 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.

**4.4.4 Seals Interfacial**

Interfacial seals shall be made of silicon base rubber.

**4.4.5 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.

**4.4.6 Potting**

Potting shall be made of epoxy resin.



4.5 MARKING

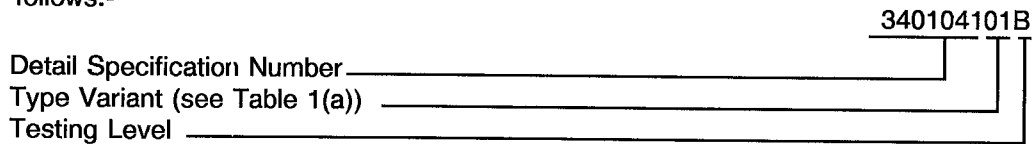
4.5.1 General

The marking of all components delivered to this specification shall be in accordance with the requirements of ESA/SCC Basic Specification No. 21700 and the following paragraphs. Each component shall be marked in respect of:-

- (a) The SCC Component Number.
- (b) Characteristics.
- (c) Traceability Information.

4.5.2 The SCC Component Number

Each component shall bear the SCC Component Number which shall be constituted and marked as follows:-



**N.B.**

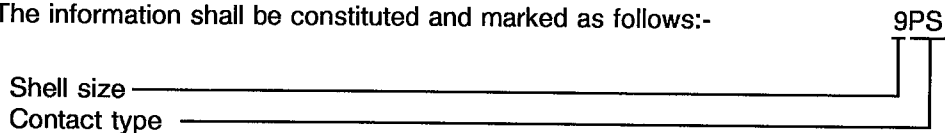
Marking of the Type Variant is mandatory. No further reference to type variant is made in this specification.

4.5.3 Characteristics

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

- (a) Shell Size.
- (b) Contact Type.

The information shall be constituted and marked as follows:-



4.5.3.1 Shell Size

Shell size shall be designated by the number of contacts.

Specified numbers are: 9, 15, 21, 25, 31, 37 and 51.

4.5.3.2 Contact Type

Contact types shall be indicated by the following code letters.

Code Letter	Contact Type
PS	Male/Female

**4.5.4 Traceability Information**

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

**4.6 ELECTRICAL MEASUREMENTS****4.6.1 Electrical Measurements at Room Temperature**

The parameters to be measured in respect of electrical characteristics are scheduled in Table 2. Unless otherwise specified, the measurements shall be performed at  $T_{amb} = +22 \pm 3$  °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 (TABLES 4 AND 5)**

Not applicable.

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

No.	Characteristic	Symbol	ESA/SCC 3401 Test Method	Test Condition	Limits		Unit
					Min.	Max.	
1	Insulation Resistance	Ri	Para. 9.1.1.1	Para. 9.1.1.1	5 000	-	MΩ
2	Voltage Proof Leakage Current	$I_L$	Para. 9.1.1.2	600 Vrms	-	2.0	mA
3	Mated Shell Conductivity (Voltage Drop) (1)	Vd	Para. 9.1.1.4	Para. 9.1.1.4	Not applicable		mV
4	Contact Resistance (Low Level Current)	Rcl max.	Para. 9.1.1.3	Para. 9.1.1.3	-	12	mΩ
5	Contact Resistance (Rated Current)	Rcr max.	Para. 9.1.1.3	Table 1(b)	-	10	mΩ

**NOTES**

1. Applicable to mated connectors with grounding option.

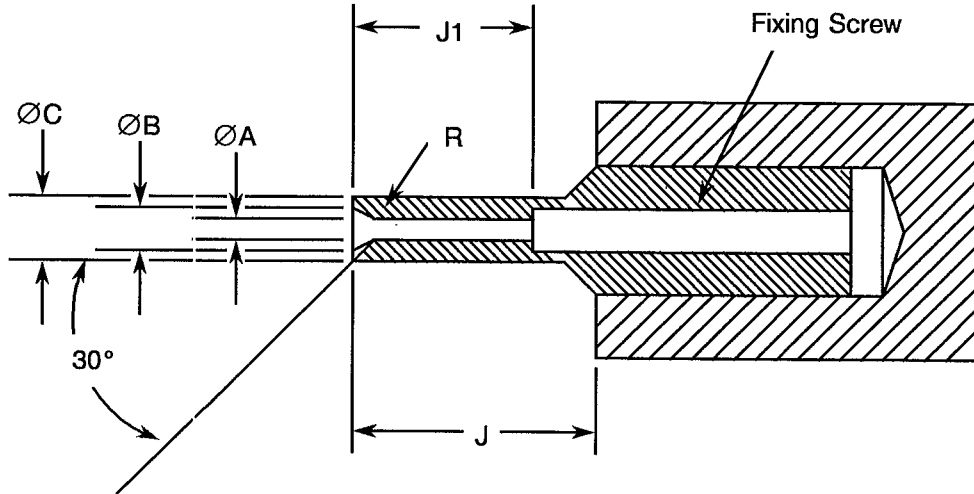
**TABLES 3, 4 AND 5**

Not applicable





**FIGURE 4 - GAUGE FIXTURE**



**MAXIMUM GAUGE**

WEIGHT (g) 170			REMARKS
	MIN.	MAX.	
ØA	0.559	0.564	-
ØB	0.749	0.775	-
ØC	0.813	0.825	-
J	4.0	-	-
J1	3.13	3.23	-
R	0.381	0.483	Note 1

**MINIMUM GAUGE**

WEIGHT (g) 14			REMARKS
	MIN.	MAX.	
ØA	0.582	0.587	-
ØB	0.749	0.775	-
ØC	0.813	0.825	-
J	4.0	-	-
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 must be polished to  $\frac{N8}{\sqrt{\quad}}$ .



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

4.8.1 Measurements and Inspections on Completion of Environmental Tests

The parameters to be measured and inspections to be performed on completion of environmental testing shall be those specified in Table 6. Unless otherwise specified, these measurements shall be performed at  $T_{amb} = +22 \pm 3$  °C.

4.8.2 Measurements and Inspections at Intermediate Points during Endurance Tests

Not applicable.

4.8.3 Measurement and Inspections on Completion of Endurance Tests

The parameters to be measured and inspections to be performed on completion of endurance testing shall be those specified in Table 6. Unless otherwise specified, these measurements shall be performed at  $T_{amb} = +22 \pm 3$  °C.

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

Not applicable.

4.8.5 Electrical Circuits for Operating Life Tests (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 ESA/SCC Generic Specification No. 3401. The temperature to be applied shall be the maximum storage temperature specified in Table 1(b) of this specification.



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**TABLE 6 - MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENTAL AND ENDURANCE TESTING**

No.	ESA/SCC 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	ESA/SCC 3401 Para. 9.9	-	-	Not applicable		-
02	Wiring	Para. 9.10	Low Level Contact Resistance	-	Rcl	Not applicable		-
03	Vibration	Para. 9.11	<b>Initial Measurements</b> Coupling screw(s) Unlocking Torque <b>Final Measurements</b> Full Engagement Coupling screw(s) Unlocking Torque Drift Visual Examination	ESCC 3601 Vibration	-  -  $\Delta Tqe/Tqe$	Record Values	-  -  -25	-  -  %
04	Shock or Bump	Para. 9.12	Full Engagement Visual Examination	-	-	-	-	-
05	Climatic Sequence	Para. 9.13	<b>Dry Heat</b> Insulation Resistance <b>Low Air Pressure</b> Voltage Proof Leakage Current <b>Damp Heat</b> Insulation Resistance <b>Final Measurements</b> External Visual Inspection  Insulation Resistance Voltage Proof Leakage Current	At High Temperature Table 2, Item 1  Figure 1 Immediately after test Table 2, Item 1 After 1-24 hrs Recovery ESA/SCC 3401 Para. 9.7 Table 2, Item 1 Table 2, Item 2	Ri  I <sub>L</sub> Ri VP Ri I <sub>L</sub>	1000  ESA/SCC 3401 9.13.5 100  ESA/SCC 3401 Para. 9.7 Table 2, Item 1 Table 2, Item 1	-  -  -  -	MΩ    MΩ    MΩ
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	ESA/SCC 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	- Ri I <sub>L</sub>	- Table 2, Item 1 Table 2, Item 1	- - -	-  -
09	Contact Retention (In Insert)	Para. 9.17 & Para. 4.3.4 of this spec.	Contact Displacement	Not applicable for male contacts	-	ESA/SCC 3401 Para. 9.17		-
10	Endurance	Para. 9.18	<b>Initial Measurements</b> Mating/Unmating Forces  Low Level Contact Resistance Mated Shell Conductivity <b>Final Measurements</b> Visual Examination Mating/Unmating Forces  Low Level Contact Drift Resistance Mated Shell Conductivity Insulation Resistance Voltage Proof Leakage Current	  Table 2, Item 4 Table 2, Item 3  - Table 2, Item 4  Table 2, Item 5  Table 2, Item 3 Table 2, Item 1 Table 2, Item 2	F  Rcl Vd  - F  $\Delta Rcl$  Vd Ri I <sub>L</sub>	Para. 4.3.5 of this spec. Record Values Not applicable  - Para. 4.3.5 of this spec. - 3.0  Not applicable Table 2, Item 1 Table 2, Item 2	-    -    mΩ	

**NOTES**

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



**TABLE 6 - MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENTAL AND ENDURANCE TESTING (CONTINUED)**

No.	ESA/SCC GENERIC SPEC. NO. 3401		MEASUREMENTS AND INSPECTIONS		SYMBOL	LIMITS		UNIT
	ENVIRONMENTAL AND ENDURANCE TESTS (1)	TEST METHOD AND CONDITIONS	IDENTIFICATION	CONDITIONS		MIN.	MAX.	
11	Permanence of Marking	Para. 9.19	-	-	-	-	-	-
12	Mating/Unmating Forces	Para. 9.20	Force	-	F	Para. 4.3.5 of this spec.		-
13	High Temperature Storage	Para. 9.21	<b>Initial Measurements</b> Low Level Contact Resistance Mated Shell Conductivity <b>Final Measurements</b> Visual Examination Mating/Unmating Forces  Low Level Contact Resistance Drift Rated Current Contact Resis. Mated Shell Conductivity 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 3 Table 2 Item 1 Table 2 Item 2 Para. 4.3.4 of this spec.	Rcl Vd  - F  ΔRcl  Rcr Vd Ri I <sub>L</sub>	Record Values Not applicable  -   - Para. 4.3.5 of this spec. -   3.0  Table 2, Item 5 Not applicable Table 2, Item 1 Table 2, Item 2 ESA/SCC 3401 Para. 9.17	mΩ	
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 and Para. 4.2.7 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 Resis. Mated Shell Conductivity Insulation Resistance Voltage Proof Leakage Current	- Table 2 Item 5 Table 2 Item 3 Table 2 Item 1 Table 2 Item 2	T Rcr Vd Ri I <sub>L</sub>	-	+100	°C
19	Maintenance Ageing	Para. 9.27	-	-	-	Not applicable		-
20	Engage/Separation Forces	Para. 9.28 & Para. 4.3.9 of this spec.	Force	-	F	Para. 4.3.9 of this spec.		-
21	Oversize Pin Exclusion	Para. 9.29 and Para. 4.3.10 of this spec.	-	-	-	Not applicable		-
22	Probe Damage	Para. 9.30 and Para. 4.3.11 of this spec.	Contact Separation Force	-	F	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.