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Pages 1 to 16

**CONTACTS, POWER, CRIMP-TYPE
AND SOLDER TYPE FOR
3401/001 AND 3401/002 CONNECTORS
ESA/SCC Detail Specification No. 3401/040**



**space components
coordination group**

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DOCUMENTATION CHANGE NOTICE

| Rev. Letter | Rev. Date | Reference | CHANGE Item | Approved DCR No. |
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| 'A' | May '91 | P1. Cover page P2. DCN P5. Para. 1.1 P11. Para. 2 | : References to ESA/SCC 3401/001 and 3401/002 amended : References to ESA/SCC 3401/001 and 3401/002 amended | None None 22785/ 23435 22785/ 23435 |
| 'B' | July '02 | P1. Cover page P2. DCN P6 Table 1(a) | : Max. weight amended for all variants | None None 221680 |



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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 for Contacts, Power, Crimp-type and Solder-type, for 3401/001 and 3401/002 Connectors.

It shall be read in conjunction with:

- ESA/SCC Generic Specification No. 3401, Connectors, Electrical, Circular and Rectangular.
- ESA/SCC Detail Specification No. 3401/001, Connectors, Electrical, Rectangular, Miniature, Non-removable Solder and Wire-wrap Type Contacts and Removable Coaxial and Power, Crimp-type and Solder-type Contacts, Based on Type D*M.
- ESA/SCC Detail Specification No. 3401/002, Connectors, Electrical, Rectangular, Miniature, Removable Crimp-type Contacts and Removable Coaxial and Power Crimp-type and Solder-type Contacts, Based on Type D*MA.

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 also 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

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

1.5 PHYSICAL DIMENSION

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

1.6 CONTACT ARRANGEMENTS

Not applicable.

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

| Variant | Type | Max. Weight (gr) | Accepted Cable (AWG) | Bucket Type |
|---------|--------|------------------|----------------------|-------------|
| 01 | Male | 2.2 | 8 | Solder |
| 02 | Female | 1.9 | 8 | Solder |
| 03 | Male | 2.15 | 12 | Solder |
| 04 | Female | 1.9 | 12 | Solder |
| 05 | Male | 2.05 | 16 | Solder |
| 06 | Female | 1.75 | 16 | Solder |
| 07 | Male | 2.8 | 8 | Crimp |
| 08 | Female | 2.45 | 8 | Crimp |
| 09 | Male | 2.25 | 10 | Crimp |
| 10 | Female | 2.0 | 10 | Crimp |
| 11 | Male | 2.0 | 12 - 14 | Crimp |
| 12 | Female | 1.65 | 12 - 14 | Crimp |

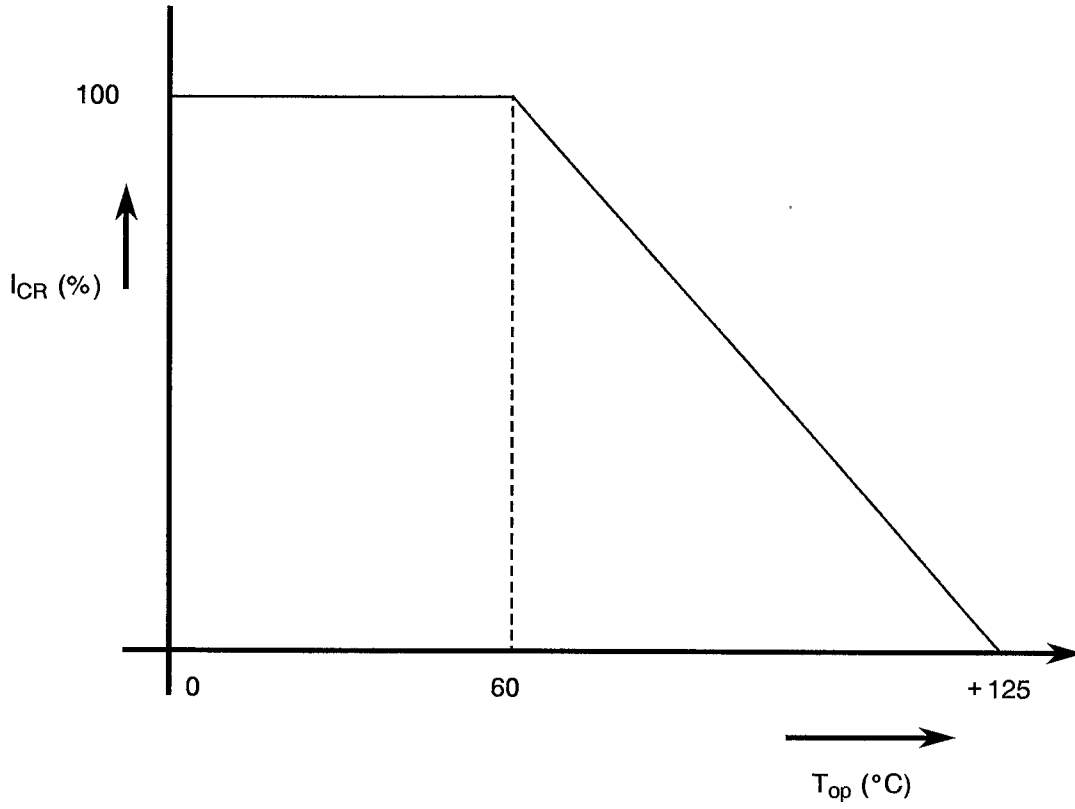
TABLE 1(b) - MAXIMUM RATINGS

| No. | Characteristic | Symbol | Maximum Rating | Unit | Remarks |
|-----|-----------------------------|-----------|----------------|------|------------------|
| 1 | Rated Current | I_{CR} | 40 | A | Note 1 Note 2 |
| 2 | Operating Temperature Range | T_{op} | -55 to +125 | °C | T_{amb} |
| 3 | Storage Temperature Range | T_{stg} | -55 to +125 | °C | |
| 4 | Soldering Temperature | T_{sol} | +260 | °C | Note 3 |

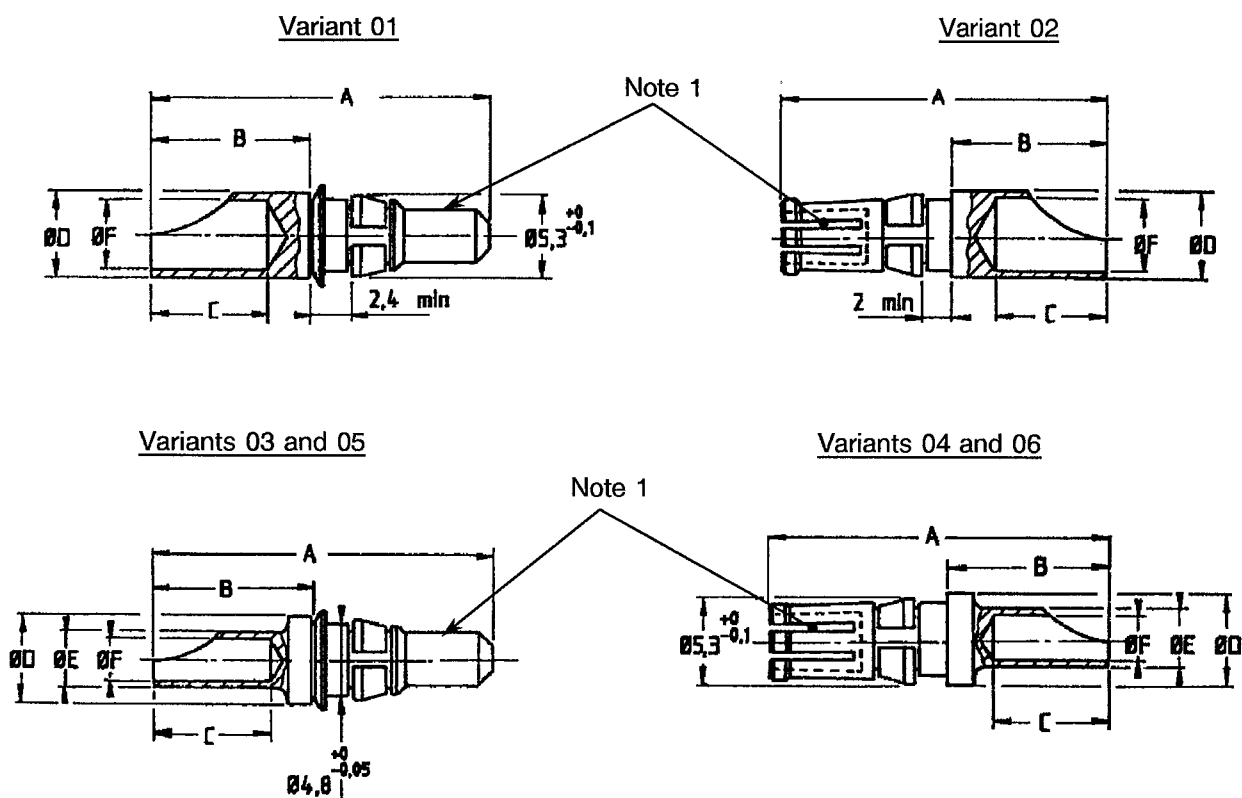
NOTES

1. This is limited either by the current carrying capability of the cable to which the contact is fitted or the derating.
2. At $T_{amb} \leq +60^{\circ}\text{C}$. For derating at $T_{amb} > +60^{\circ}\text{C}$, see Figure 1.
3. 10 seconds maximum.

FIGURE 1 - PARAMETER DERATING INFORMATION



Rated Contact Current versus Temperature

FIGURE 2 - PHYSICAL DIMENSIONS
FIGURE 2(a) - SOLDER TYPE


| Variant (Note 2) | Type | AWG | A Max. | B Max. | C Max. | ∅D Max. | ∅E Max. | ∅F Max. |
|------------------|--------|-----|--------|--------|--------|---------|---------|---------|
| 01 | Male | 8 | 22.1 | 10.8 | 8.13 | 5.66 | - | 4.90 |
| 02 | Female | 8 | 21.8 | 10.8 | 8.13 | 5.66 | - | 4.90 |
| 03 | Male | 12 | 22.1 | 10.8 | 8.13 | 5.66 | 3.76 | 3.00 |
| 04 | Female | 12 | 21.8 | 10.8 | 8.13 | 5.66 | 3.76 | 3.00 |
| 05 | Male | 16 | 22.1 | 10.8 | 8.13 | 5.66 | 2.67 | 1.90 |
| 06 | Female | 16 | 21.8 | 10.8 | 8.13 | 5.66 | 2.67 | 1.90 |

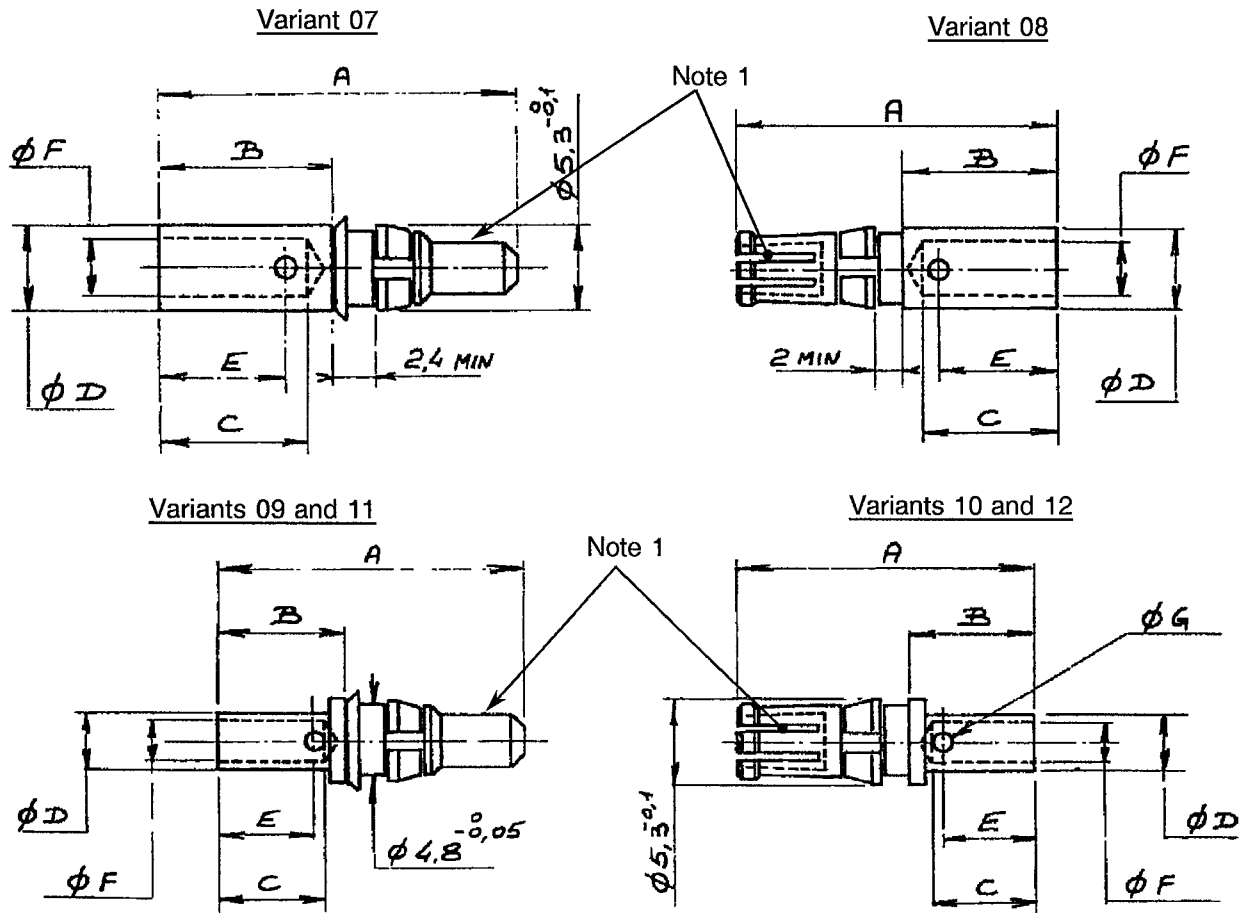
NOTES

1. Measurement point for gold-plating thickness.
2. All dimensions are in millimetres.



FIGURE 2 - PHYSICAL DIMENSIONS (Continued)

FIGURE 2(b) - CRIMP TYPE



| Variant (Note 2) | Type | AWG | A Max. | B Max. | C Min. | ØD Max. | E Ref. | ØF Min. | ØG Ref. |
|------------------|--------|-------|--------|--------|--------|---------|--------|---------|---------|
| 07 | Male | 8 | 24.7 | 12.9 | 11.1 | 5.8 | 10 | 4.2 | 1.7 |
| 08 | Female | 8 | 24.6 | 12.9 | 11.1 | 5.8 | 10 | 4.2 | 1.7 |
| 09 | Male | 10 | 21.6 | 10 | 8.4 | 4.7 | 7.5 | 3.25 | 1.3 |
| 10 | Female | 10 | 21.5 | 10 | 8.4 | 4.7 | 7.5 | 3.25 | 1.3 |
| 11 | Male | 12/14 | 19.3 | 7.7 | 6.35 | 3.8 | 6 | 2.5 | 1 |
| 12 | Female | 12/14 | 19.2 | 7.7 | 6.35 | 3.8 | 6 | 2.5 | 1 |

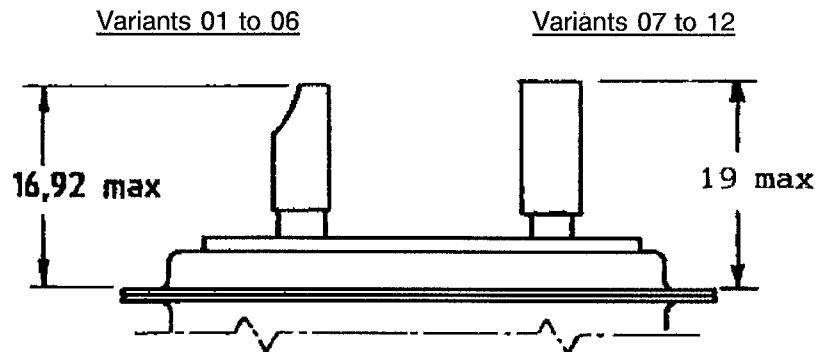
NOTES

1. Measurement point for gold-plating thickness.
2. All dimensions are in millimetres.

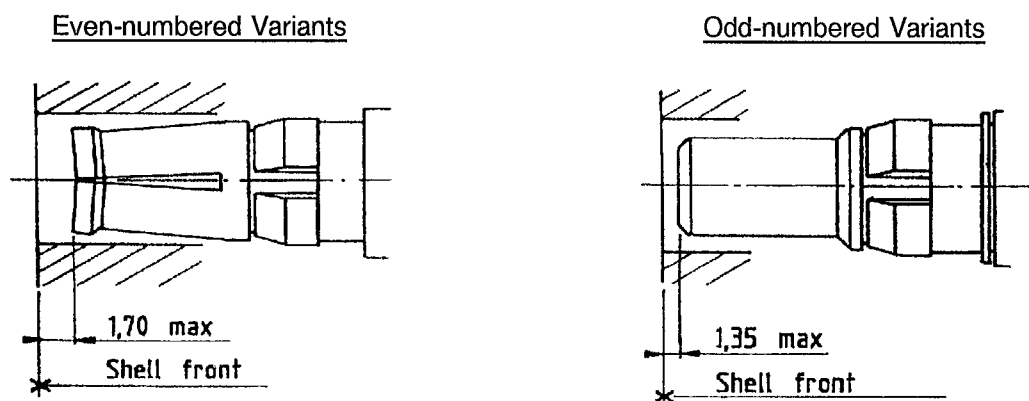
FIGURE 2 - PHYSICAL DIMENSIONS (Continued)

FIGURE 2(c) - 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. 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. 3401/001, Connectors, Electrical, Rectangular, Miniature, Non-removable Solder and Wire-wrap-type Contacts and Removable Coaxial and Power, Crimp-type and Solder-type Contacts, Based on Type D*M.
- (c) ESA/SCC Detail Specification No. 3401/002, Connectors, Electrical, Miniature, Removable Crimp-type Contacts and Removable Coaxial and Power Crimp-type and Solder-type Contacts, based on Type D*MA.
- (d) ESA/SCC Basic Specification No. 20534, External Visual Inspection of Electrical Connectors.
- (e) MIL-C-14550, Copper Plating, Electro-deposited.
- (f) MIL-G- 45204, Gold Plating, Electro-deposited.

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.

4. REQUIREMENTS**4.1 GENERAL**

The complete requirements for procurement of the contacts specified herein are stated in this specification and ESA/SCC Generic Specification No. 3401 for Connectors, Electrical, Circular and Rectangular. Deviations from the Generic Specification, applicable to this Detail 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 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)

None.

4.2.4 Deviations from Qualification Tests (Chart IV)

- (a) Para. 9.21, Oversize Pin Exclusion: Not applicable.
- (b) Para. 9.24, Probe Damage Test: Not applicable.
- (c) Para. 9.27, Solderability: Bit size 7.5mm.
- (d) Para. 9.29, Pull Test: The direction of pull shall be in the contact axis.

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. 9.11 of ESA/SCC Generic Specification No. 3401 and shall conform to those shown in Figure 2.

4.3.2 Weight

The maximum weight of the contacts specified herein shall be as specified in Table 1(a).

4.3.3 Crimp Tensile Strength or Pull Test

4.3.3.1 Crimp Tensile Strength (Variants 07 to 12)

The contacts shall be crimped to stranded wire of the appropriate size as shown below. The contact and the wire shall be separated from each other, using a tensile strength machine. The values of the force at separation of the contact and wire and the method of failure shall be recorded and shall be in accordance with the following values:

| Variant | Wire Size (AWG) | Minimum Value of Tensile Strength (daN) |
|---------|-----------------|---|
| 07/08 | 8 | > 50 |
| 09/10 | 10 | > 50 |
| 11/12 | 12 - 14 | > 30 |

i.e. "pull-out", "break in crimp", "break in wire".

4.3.3.2 Pull Test (Variants 01 to 06)

The contacts shall be soldered to stranded wire of the appropriate size shown in Table 1(a) of this specification. The wire shall break before the solder. If the solder breaks before the wire, examine the solder pot for incomplete covering.

4.3.4 Gold Plate Thickness

The thickness of the gold plate deposited on the contacts specified herein shall be checked and meet the requirements of Subpara. 4.4.1. Measurements shall be performed on active parts as specified in Figure 2.

4.3.5 Contact Insertion and Withdrawal Forces (Variants 02, 04, 06, 08, 10, 12)

The contact insertion and withdrawal forces of the female contacts shall be as specified hereunder.

| | Maximum Diameter Test Pin 3.532(+ 0-0.0025) mm | Minimum Diameter Test Pin 3.581(+ 0.0025-0) mm |
|------------|--|--|
| Insertion | 700gr | 85gr |
| Withdrawal | 567gr | 85gr |



4.3.6 Female Contact Capability (Variants 02, 04, 06, 08, 10, 12)

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

| | Pick-up Weight | Drop Weight |
|-----------------|----------------|-------------|
| Weight | 567gr | 85gr |
| Pin Diameter | 3.63mm | 3.58mm |
| Insertion Depth | 3.17mm | 3.17mm |

4.3.7 Oversize Pin Exclusion

Not applicable.

4.3.8 Probe Damage Test

Not applicable.

4.4 MATERIAL 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. The contacts shall be plated as specified in MIL-G-45204, Type II, Grade 'C', gold over copper in accordance with MIL-C-14550. Gold plating thickness shall be 1.27µm minimum over 1µm minimum of copper.

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 subparagraphs. These components being the too small to accommodate the marking as specified hereafter, the marking requirements in full shall accompany each lot of components in its primary package. Such marking shall comprise:-

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

4.5.2 The SCC Component Number

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

340104001B

Detail Specification Number _____
Type Variant (see Table 1(a)) _____
Testing Level _____



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

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

Not applicable.

4.6.3 Circuits for Electrical Measurements (Figure 4)

Not applicable.

4.7 Screening Tests (Tables 4 and 5)

Not applicable.

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

| No. | Characteristics | Symbol | ESA/SCC Gen. Spec. 3401 | Test Condition | Limits | | Unit |
|-----|--|----------------|-------------------------|----------------|--------|------|------|
| | | | | | Min. | Max. | |
| 1 | Contact Resistance (Low Level Current) | R _C | Para. 9.28 | Para. 9.28.2 | 2.5 | - | mΩ |
| 2 | Contact Resistance (Rated current) | R _C | Para. 9.28 | Para. 9.28.2 | 7 | - | mΩ |

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

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 $T_{amb} = +22 \pm 3 \text{ }^\circ\text{C}$.

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

Not applicable.

4.8.5 Electrical Circuits for Operating Life Test

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.



TABLE 6 - MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENTAL AND ENDURANCE TESTS

| No. | ESA/SCC Gen. Spec. No. 3401 | | Measurements and Inspections | | Symbol | Limits | | Unit |
|-----|---|--|-------------------------------|--|----------------------------------|----------------------------------|------|------|
| | Environmental and Endurance Tests (1) | Test Method and Conditions | Identification | Conditions | | Min. | Max. | |
| 01 | Female Contact Capability | Para. 9.6 | Pick Up Weight Drop Weight | Para. 4.3.6 Para. 4.3.6 | | Pick Up Drop | | |
| 02 | Oversize Pin Exclusion | Para. 9.21 | Not applicable | - | | - | - | |
| 03 | Gold Plate Thickness | Para. 9.22 | Gold Plate Thickness | Para. 4.3.4 | | Para. 4.3.4 | | |
| 04 | Gold Plate Porosity | Para. 9.23 | Not applicable | - | | - | - | |
| 05 | Probe Damage Test | Para. 9.24 | Not applicable | - | | - | - | |
| 06 | Contact Insertion and Withdrawal Forces | Para. 9.25 | Forces | Para. 4.3.5 | | Para. 4.3.5 | | |
| 07 | Crimp Visual Inspection | Para. 9.26 | Visual Examination | - | | - | - | |
| 08 | Solderability | Para. 9.27 and Para. 4.2.4 of this Spec. | - | - | | - | - | |
| 09 | Contact Resistance | Para. 9.28 | Contact Resistance | Low Level Table 2 Item 1 Rated Level Table 2 Item 2 | R _C R _C | Table 2 Item 1 Table 2 Item 2 | | |
| 10 | Crimp Tensile Strength | Para. 9.29 | - | Para. 4.3.3.1 | | - | - | |
| 11 | Pull Test | Para. 9.29 and Para. 4.2.4 of this Spec. | - | Para. 4.3.3.2 | | - | - | |
| 12 | Endurance | Para. 9.15 | Contact Resistance Drift | Low Level Table 2 Item 1 | ΔR _C | - | 0.5 | mΩ |
| | | | Contact Resistance | Low Level Table 2 Item 1 | R _C | - | 2.5 | mΩ |
| 13 | High Temperature Storage | Para. 9.19 + 125°C | Contact Resistance Drift | Low Level Table 2 Item 1 | ΔR _C | - | 0.5 | mΩ |
| | | | Contact Resistance | Low Level Table 2 Item 1 | R _C | - | 2.5 | mΩ |

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