



**CONNECTOR SAVERS, ELECTRICAL, CIRCULAR,  
MINIATURE, NON-REMOVABLE CONTACTS,  
BASED ON TYPE DBAS**

**ESCC Detail Specification No. 3401/033**

**ISSUE 1  
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BASED ON TYPE DBAS  
ESA/SCC Detail Specification No. 3401/033**



**space components  
coordination group**

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**DOCUMENTATION CHANGE NOTICE**

Rev. Letter	Rev. Date	Reference	CHANGE Item	Approved DCR No.
'A'	Nov. '98	P1. Cover Page P2. DCN P7. Figure 2 P9. Figure 2(b) P14. Para. 4.5.4 Para. 4.5.4.2 Para. 4.5.4.3  P16. Table 2	: Subtitles amended : New Note 3 added : Part marking amended : Text amended : In the text, "letters" deleted : In the Table, "Code Letter" amended to "Code Number" and SP and PS replaced by "1" and "2" respectively : No.4 , In Characteristics, "Coaxial (3)" deleted : , In Test Conditions, reference corrected : In Note 1, "and Coaxial" deleted : In Note 3, "Coaxial and" deleted	None None 23900 23902 23900 23900 23900 23900 23900 23900 23900 23900
'B'	Jun. '99	P1. Cover page P2. DCN P7. Figure 2	: In the first Table, values for Dimenisons D and E swapped over between Variants 01 and 02 and Dimension "F" values amended for Variants 01 and 02	None None 221522
'C'	Dec. '01	P1. Cover page P2. DCN P7. Figure 2	: Modification of dimension Min E for Variant 02	None None 23949

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4 Not applicable	N/A
5 Not applicable	N/A
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**APPENDICES (Applicable to specific Manufacturers only)**

None.

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**1. GENERAL**

**1.1 SCOPE**

This specification details the ratings, physical and electrical characteristics, test and inspection data for Connector Savers, Electrical, Circular, Miniature, with Non-removable Contacts, based on Type DBAS. It shall be read in conjunction with ESA/SCC Generic Specification No. 3401, the requirements of which are supplemented herein and ESA/SCC Detail Specifications No. 3401/008 and 3401/009.

**1.2 TYPE VARIANTS AND RANGE OF COMPONENTS**

The different sizes of connector savers specified herein, which are also covered by this specification, together with their mechanical characteristics, are given in Table 1(a) and Figure 2.

**1.3 MAXIMUM RATINGS**

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

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

Not applicable.

**1.5 PHYSICAL DIMENSIONS**

The physical dimensions of the connector savers 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) ESA/SCC Generic Specification No. 3401, Connectors, Electrical, Non-Filtered, Circular and Rectangular.
- (b) ESA/SCC Detail Specification No. 3401/008, Connectors, Miniature, Electrical, Circular, Push – Pull Coupling, Crimp-type, Removable Contacts, based on Type DBAS.
- (c) ESA/SCC Detail Specification No. 3401/009, Contacts, Electrical, Crimp-Type, for 3401/007 and 3401/008 Connectors.
- (d) MIL-STD-202, Test Methods for Electronic and Electrical Component Parts.
- (e) MIL-STD-1344, Test Methods for Electrical Connectors.

**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) - RANGE OF COMPONENTS**

SHELL SIZE (Note 1)	MAX. WEIGHT (g) (Note 2)	MATING FORCE FOR THE PLUG END MAX. daN	UNMATING FORCE FOR THE PLUG END	
			MIN. daN	MAX. daN
03	30	6.8	0.54	6.8
07	40	8.9	0.66	8.9
12	55	15.1	0.89	15.1
19	70	16.9	1.33	16.9
27	95	17.8	1.78	17.8
37	115	19.6	2.67	19.6
61	170	21.8	3.11	21.8

**NOTES**

1. For Variants, see Figure 2.
2. With contacts.

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

No.	CHARACTERISTIC	SYMBOL	MAXIMUM RATING	UNIT	REMARKS
1	Working Voltage (Sea Level)	$U_R$	375	Vrms	
2	Rated Current Contact Gauge 20 Contact Gauge 16 Contact Gauge 12 Contact Gauge 08	$I_R$	5.0 13 23 46	A	-
3	Operating Temperature Range	$T_{op}$	-65 to +200	°C	$T_{amb}$
4	Storage Temperature Range	$T_{stg}$	-65 to +200	°C	

**FIGURE 1 - PARAMETER DERATING INFORMATION**

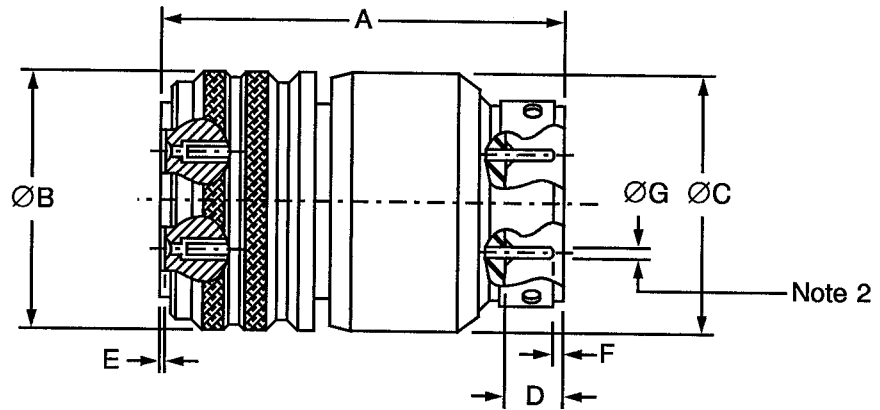
Not applicable.



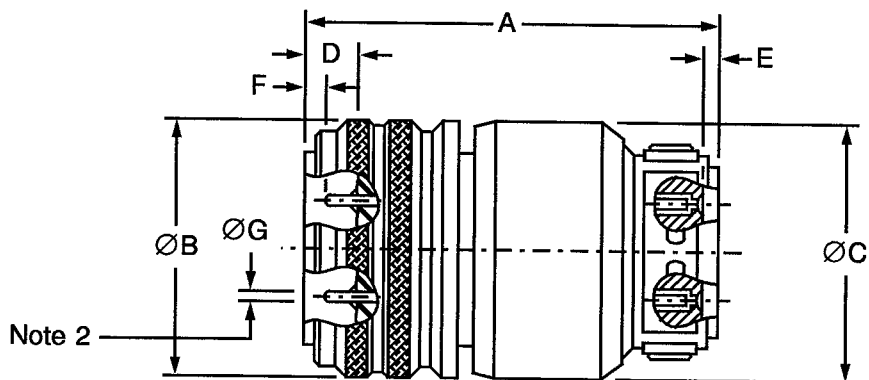


**FIGURE 2 - PHYSICAL DIMENSIONS**

**VARIANT 01 - DBAS171**



**VARIANT 02 - DBAS172**



	A		D		E		F	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Variant 01	-	54.55	6.80	7.15	2.00	2.40	1.15	2.05
Variant 02	-	55.20	9.45	10.00	0.28	0.66	3.78	4.90

SHELL SIZE (3)	03	07	12	19	27	37	61
ØB Max.	20.40	23.70	26.90	31.50	36.10	39.30	47.30
ØC Max.	18.30	21.90	24.80	28.40	31.90	35.10	43.30

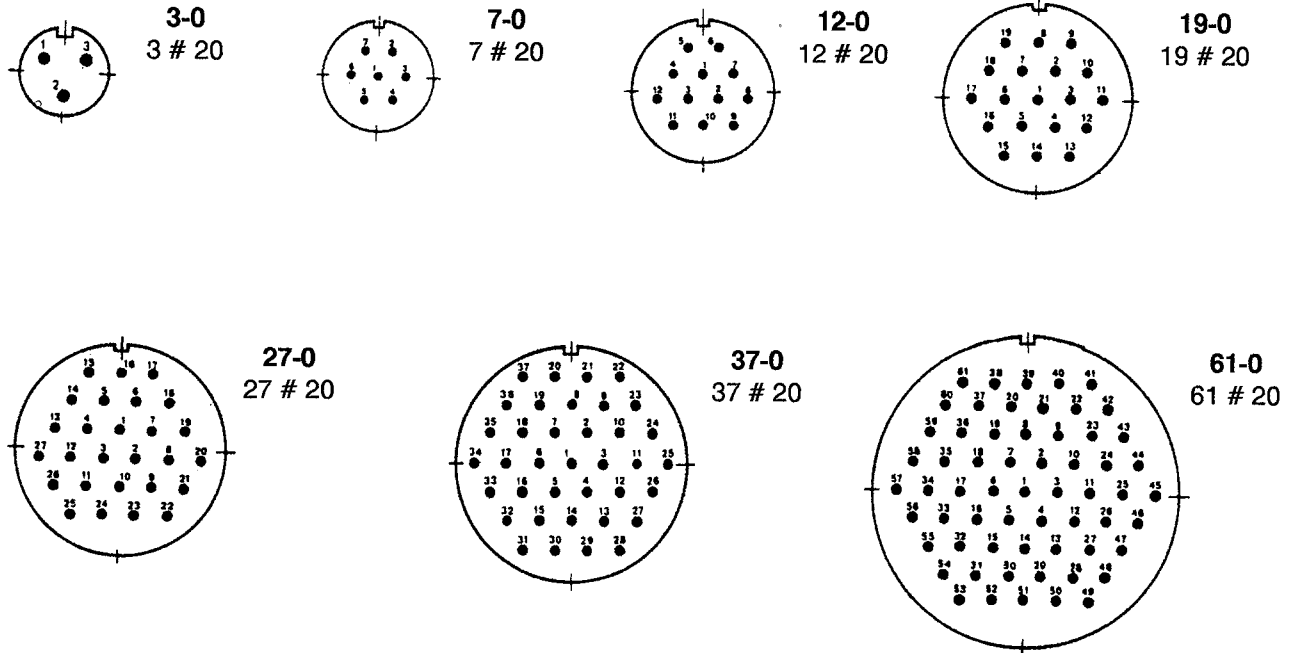
**NOTES**

1. All dimensions are in millimetres.
2. For ØG contact diameters, see ESA/SCC Detail Specification No. 3401/009.
3. Dimensions ØB and ØC are identical for both Variants.



**FIGURE 2 - PHYSICAL DIMENSIONS**

**FIGURE 2(a) - STANDARD CONTACT ARRANGEMENTS, FRONT VIEW MALE INSERT**



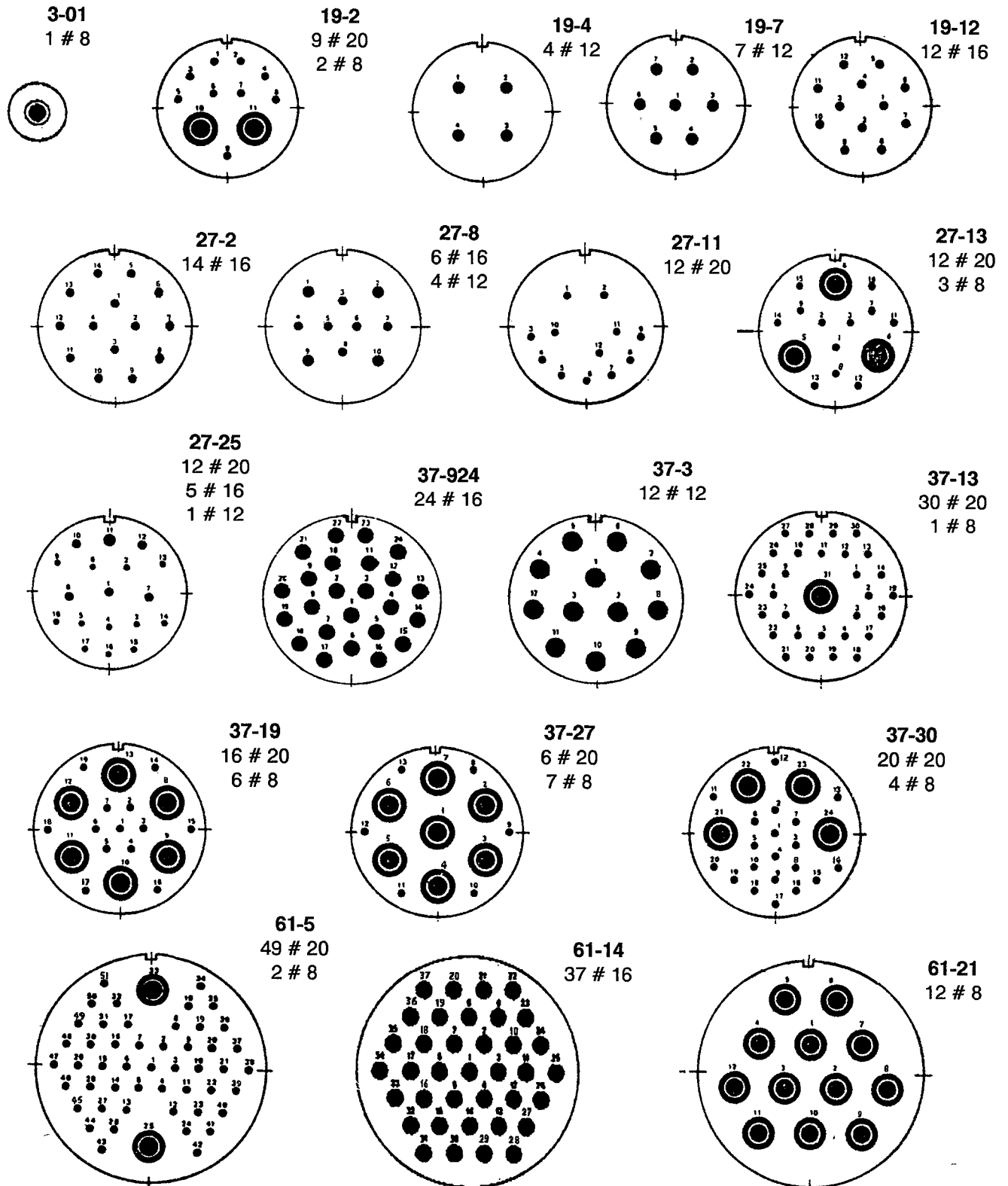
**NOTES**

1. Contact locations and identifications in conformity with the applicable MS drawing.
2. Both sides of the inserts shall be marked.



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

**FIGURE 2(b) - SPECIAL CONTACT ARRANGEMENTS, FRONT VIEW MALE INSERT**



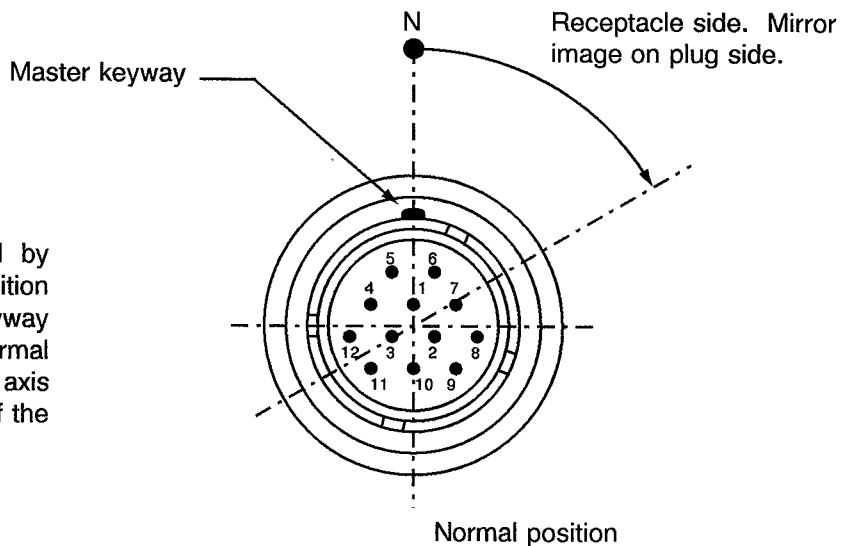
**NOTES**

1. Contact locations and identifications in conformity with the applicable MS drawing.
2. Both sides of the inserts shall be marked.
3. Connector savers with coaxial contacts are not available.



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

**FIGURE 2(c) - INSERT CLOCKING POSITIONS**



**NOTES**

1. The clocking position is determined by the different angles of the insert position with respect to the master keyway position which is fixed. The normal position is achieved when the vertical axis of the insert is the same as the axis of the master keyway.

Shell Size and Contact Arrangement	Insert Clocking Positions (°)				
	W	X	Y	B	C
3 - 0	-	-	75	-	-
3 - 01	-	-	-	-	-
7 - 0	-	-	-	150	-
12 - 0	15	50	75	150	225
19 - 0	-	-	75	150	225
19 - 2	25	50	75	150	225
19 - 4	-	-	22.3	135	247.3
19 - 7	-	-	75	150	225
19 - 12	25	50	75	150	225
27 - 0	25	50	75	150	225
27 - 2	25	50	-	150	-
27 - 8	25	50	75	150	225
27 - 11	25	50	75	150	225
27 - 13	25	50	75	150	225
27 - 25	25	50	75	150	225
37 - 0	25	-	75	150	225
37 - 924	105	13	-	-	-
37 - 3	20	70	-	-	-
37 - 13	-	-	75	150	225
37 - 19	-	-	75	150	225
37 - 27	-	-	75	150	225
37 - 30	25	50	75	150	225
61 - 0	25	-	75	150	225
61 - 5	25	50	75	150	225
61 - 14	-	-	-	-	-
61 - 21	25	50	75	150	225



#### **4. REQUIREMENTS**

##### **4.1 GENERAL**

The complete requirements for procurement of the connector savers 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 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)**

- (a) Para. 9.4, Contact Capability: Not applicable.
- (b) Para. 9.5, Magnetism Level: Not applicable.
- (c) Para. 9.8, Installation of Contacts into Insert: Not applicable.
- (d) Para. 9.9, Seal Test: 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. 9.10, Wiring: Not applicable.
- (d) Para. 9.11, Vibration: 20g, 10 - 2000 Hz.
- (e) Para. 9.12, Mechanical Shock: 100g, 11ms, half-sine.
- (f) Para. 9.15, Joint Strength: Not applicable.
- (g) Para. 9.31, Solderability: Not applicable.

###### **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. 9.10, Wiring: Not applicable.
- (d) Para. 9.15, Joint Strength: Not applicable.
- (e) Para. 9.31, Solderability: Not applicable.



#### 4.3 MECHANICAL REQUIREMENTS

##### 4.3.1 Dimension Check

The dimensions of the connector savers specified herein shall be verified in accordance with the requirements set out in Para. 9.6 of ESA/SCC Generic Specification No. 3401. They shall conform to those shown in Figure 2 of this specification.

##### 4.3.2 Weight

The maximum weight of the connector savers specified herein, with contacts, shall be as specified in Table 1(a) of this specification.

##### 4.3.3 Contact Capability

As specified in ESA/SCC Detail Specification No. 3401/009.

##### 4.3.4 Contact Retention (In Insert)

As specified in ESA/SCC Detail Specification No. 3401/008.

##### 4.3.5 Mating and Unmating Forces

The forces applied for mating and unmating of the connector savers (axial) shall conform to the values specified in Table 1(a).

##### 4.3.6 Insert Retention (In Shell)

Connector saver inserts shall withstand a pressure of 5.27kg/cm<sup>2</sup> without being dislodged from the shell.

##### 4.3.7 Jackscrew Retention

Not applicable.

##### 4.3.8 Contact Insertion and Withdrawal Forces

As specified in ESA/SCC Detail Specification No. 3401/009.

##### 4.3.9 Engagement and Separation Forces

As specified in ESA/SCC Detail Specification No. 3401/009.

##### 4.3.10 Oversize Pin Exclusion

As specified in ESA/SCC Detail Specification No. 3401/009.

##### 4.3.11 Probe Damage

As specified in ESA/SCC Detail Specification No. 3401/009.

##### 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 connector savers 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 Shell and Coupling Ring

The shell and coupling ring shall be made of aluminium alloy, nickel plated.

4.4.2 Inserts

Bonded sandwich: Silicone/phenolic/silicone.

4.4.3 Contacts

As specified in ESA/SCC Detail Specification No. 3401/009.

4.4.4 Contact Retaining Clip

Not applicable.

4.4.5 Guiding and Locking Devices

Not applicable.

4.4.6 Magnetism Level

Not applicable.

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. When the component is too small to accommodate all of the marking as 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) Contact Identification.
- (b) The SCC Component Number.
- (c) Characteristics.
- (d) Traceability Information.

4.5.2 Contact Identification

Contact identification shall be marked in accordance with Figures 2(a) and 2(b).

4.5.3 The SCC Component Number

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

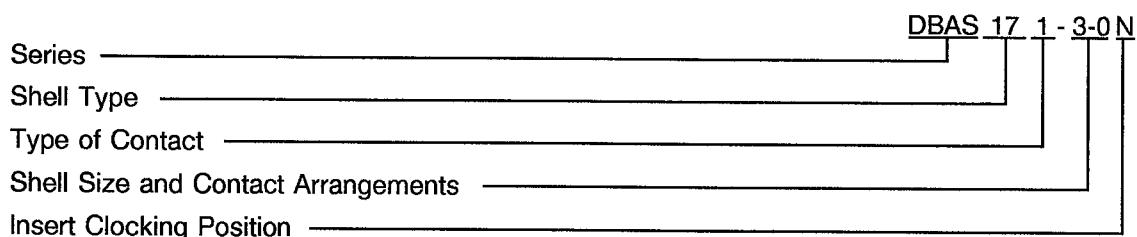
Detail Specification Number		340103301B
Type Variant (see Figure 2)		
Testing Level		

**4.5.4 Characteristics**

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

- (a) Series.
- (b) Shell Type.
- (c) Type of Contact.
- (d) Shell Size and Contact Arrangements.
- (e) Insert Clocking Position.

The information shall be constituted and marked as follows:-



**4.5.4.1 Series**

This connector saver series shall be designated by letters DBAS.

**4.5.4.2 Shell Type**

The shell type shall be designated by the number 17.

**4.5.4.3 Type of Contact**

The contact types shall be designated by the following codes.

Variant	Code Number	Contact Types
01	1	Female (plug side) / Male (receptacle side)
02	2	Male (plug side) / Female (receptacle side)

**4.5.4.4 Shell Sizes and Contact Arrangements**

Shell sizes and contact arrangements shall be as shown in Figures 2(a) and 2(b).

**4.5.4.5 Insert Clocking Position**

Insert clocking positions are as shown in Figure 2(c) and shall be designated by the following letter codes W, X, Y, B and C. Code letter N indicates the standard clocking position.

**4.5.5 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  $T_{amb} = +22 \pm 3$  °C.

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

Not applicable.

##### 4.6.3 Circuit 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.	CHARACTERISTICS	SYMBOL	ESA/SCC 3401 TEST METHOD	TEST CONDITION	LIMITS		UNIT
					MIN.	MAX.	
1	Insulation Resistance	R <sub>i</sub>	Para. 9.1.1.1	Para. 9.1.1.1	10 000	-	MΩ
2	Voltage Proof Leakage Current (Sea Level)	I <sub>L</sub>	Para. 9.1.1.2	Note 1	-	2.0	mA
3	Mated Shell Conductivity (Voltage Drop) (Note 2)	V <sub>d</sub>	Para. 9.1.1.4	Para. 9.1.1.4	Not applicable		mV
4	Contact Resistance (Low Level Current) Gauge 20 Power (3)	R <sub>cl</sub> max.	Para. 9.1.1.3	Para. 9.1.1.3	-	6.0	mΩ
5	Contact Resistance (Rated Current)	R <sub>cr</sub> max.	Para. 9.1.1.3	Gauge 20 Gauge 16 Gauge 12 Gauge 08 Note 4	- - - -	11 4.0 2.0 0.5	mΩ

**NOTES**

- Gauge 20 Contacts: 1250 Vrms.  
Power Contacts: 1000 Vrms.  
For mixed contact arrangements, the voltage applied between dissimilar contacts shall be the higher that would be applied between either of the contacts in question tested with an identical contact.
- Applicable to mated connectors with grounding option.
- See ESA/SCC Detail Specification No. 3401/009 for Power Contacts.
- For rated current, see Table 1(b), Item No. 2.

**TABLES 3, 4 AND 5**

Not applicable.



- 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 tests are scheduled in Table 6 of this specification. Unless otherwise stated, the 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.
- 4.8.2 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 of this specification. Unless otherwise stated, the measurements shall be performed at  $T_{amb} = +22 \pm 3$  °C.
- 4.8.3 Conditions for Operating Life Tests (Part of Endurance Testing)  
Not applicable.
- 4.8.4 Electrical Circuits for Operating Life Tests (Figure 5)  
Not applicable.
- 4.8.5 Conditions for High Temperature Storage Test (Part of Endurance Testing)  
The requirements for the high temperature storage test are specified in ESA/SCC 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 TESTS**

NO.	ESA/SCC GENERIC 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 and Paras 4.2.4 and 4.2.5 of this spec.	Not applicable					
02	Wiring	Para. 9.10 and Paras 4.2.4 and 4.2.5 of this spec.	Not applicable					
03	Vibration	Para. 9.11 and Para. 4.2.4 of this spec.	<b>Initial Measurements</b> Coupling Screw(s) Unlocking Torque <b>Final Measurements</b> Full Engagement Coupling Screw(s) Unlocking Torque Drift Visual Examination	- - - -	- - - -	Not applicable  Not applicable		
04	Shock or Bump	Para. 9.12 and Para. 4.2.4 of this spec.	Full Engagement Visual Examination	- -	- -	- -	- -	
05	Climatic Sequence	Para. 9.13	<b>Dry Heat</b> Insulation Resistance <b>Low Air Pressure</b> Voltage Proof Leakage Curr.  <b>Damp Heat</b> Insulation Resistance  External Visual Inspection  Insulation Resistance Voltage Proof Leakage Curr.	Table 2 Item 1  Figure 1  <b>Immediately after test</b> Table 2 Item 1 <b>After 1-24 hrs Recovery</b> ESA/SCC 3401 Para. 9.7 Table 2 Item 1 Table 2 Item 2	Ri  I <sub>L</sub>  Ri  -  Ri I <sub>L</sub>	1 000  ESA/SCC 3401 Para. 9.13.5  100  ESA/SCC 3401 Para. 9.7 Table 2 Item 1 Table 2 Item 2	- - - - - -	MΩ       MΩ
06	Plating Thickness	Para. 9.14	Thickness			ESA/SCC 3401/009		
07	Joint Strength	Para. 9.15 and Paras 4.2.4 and 4.2.5 of this spec.	Not applicable					
08	Rapid Change of Temperature	Para. 9.16	Visual Examination Insulation Resistance Voltage Proof Leakage Curr.	- Table 2 Item 1 Table 2 Item 2	- Ri I <sub>L</sub>	- Table 2 Item 1 Table 2 Item 2	- -	
09	Contact Retention (in insert)	Para. 9.17 and Para. 4.3.4 of this spec.	Contact Displacement			ESA/SCC 3401 Para. 9.17		

**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 TESTS (CONT'D)**

NO.	ESA/SCC GENERIC NO. 3401		MEASUREMENTS AND INSPECTIONS		SYMBOL	LIMITS		UNIT
	ENVIRONMENTAL AND ENDURANCE TESTS (1)	TEST METHOD AND CONDITIONS	IDENTIFICATION	CONDITIONS		MIN	MAX	
10	Endurance	Para. 9.18	<b>Initial Measurements</b> Mating/Unmating Forces  Low Level Contact Resist Mated Shell Conductivity <b>Final Measurements</b> Visual Examination Mating/Unmating Forces  Low Level Contact Resistance Drift Mated Shell Conductivity Insulation Resistance Voltage Proof Leakage Curr.	ESA/SCC 3401/009 Table 2 Item 3  -  ESA/SCC 3401/009 Table 2 Item 3 Table 2 Item 1 Table 2 Item 2	F Rcl Vd - F ΔRcl Vd Ri I <sub>L</sub>	Para. 4.3.5 of this spec. Record Values Not applicable - - Para. 4.3.5 of this spec. ESA/SCC 3401/009 Not applicable Table 2 Item 1 Table 2 Item 2	-	
11	Permanence of Marking	Para. 9.19	As applicable		-	-	-	
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 Resis. 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 Curr. Contact Retention (in insert)	ESA/SCC 3401/009 Table 2 Item 3  -  ESA/SCC 3401/009 ESA/SCC 3401/009 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. ESA/SCC 3401/009 ESA/SCC 3401/009 Not applicable Table 2 Item 1 Table 2 Item 2 ESA/SCC 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.	Visual Examination	-	-	Para. 4.3.6		
16	Jackscrew Retention	Para. 9.24 & Para. 4.3.7 of this spec.	Not applicable					
17	High Temperature Measurements	Para. 9.25	Insulation Resistance	Table 2 Item 1	Ri	500	-	MΩ
18	Overload Test	Para. 9.26	Internal Temperature Rated Current Contact Resis. Mated Shell Conductivity Insulation Resistance Voltage Proof Leakage Curr.	ESA/SCC 3401/009 Table 2 Item 3 Table 2 Item 1 Table 2 Item 2	T Rcr Vd Ri I <sub>L</sub>	- + 100 ESA/SCC 3401/009 Not applicable Table 2 Item 1 Table 2 Item 2		°C

**NOTES**

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

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**TABLE 6 - MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENTAL AND ENDURANCE TESTS (CONT'D)**

NO.	ESA/SCC GENERIC NO. 3401		MEASUREMENTS AND INSPECTIONS		SYMBOL	LIMITS		UNIT
	ENVIRONMENTAL AND ENDURANCE TESTS (1)	TEST METHOD AND CONDITIONS	IDENTIFICATION	CONDITIONS		MIN	MAX	
19	Maintenance Aging	Para. 9.27	Visual Examination Contact Retention  Contact Insertion & Withdrawal Forces	Para. 4.3.4 of this spec  Para. 4.3.8 of this spec		-	-	ESA/SCC 3401 Para. 9.17 Para. 4.3.8
20	Engage/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.						ESA/SCC 3401 Para. 9.29
22	Probe Damage	Para. 9.30 & Para. 4.3.11 of this spec.	Contact Separation Force	Para. 4.3.9 of this spec.				Para. 4.3.9
23	Solderability	Para. 9.31 & Paras. 4.2.4 and 4.2.5 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.