DOCUMENT CHANGE REQUEST

DCR Class

TO BE COMPLETED BY ORIGINATOR

Change request No. 1

Originator	JOHN HOWLEY (1)	**Originator signature** (2)	
Affiliation	IRISH EXPERT SCCG	Date: 26 NOVEMBER 2002	Page 1 of [22] (3)

DOCUMENT AFFECTED

Doc. No. (4)	Status (5)	Title: Thermistors (Thermally Sensitive (6) Resistors), NTC
4006/014	ISSUE 1	

Other documents affected (8)

4006/~~002~~ Hahn
~~4~~006/013

Paragraph(s) and page(s) affected: (7)
See attached mark-up.

PROPOSED WORDING OF CHANGE (9)

See attached mark-up for details.

Continuation sheet(s) attached
[X] Yes [ ] No

JUSTIFICATION (10)

1. To make this specification consistent with documents 4006/002 and 4006/013 and to add Variant 06, an equivalent to Variant 32 of Matra Marconi Space MMS Detail Specification MA-4006-AAB Issue 6.
2. With respect to sampling plans, MIL-STD-105 is withdrawn and hence the use of IEC410.
3. Update of Table 1(a) to meet current manufacturing practices. Temperature range increased to -60°C to accommodate Variant 06.

Continuation sheet(s) attached
[X] Yes [ ] No

Changes required for: Procurement (project) [ ] Qualification [ ] MRB decision [ ] (11)
General Improvement of Spec. [X] Other [ ]

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Date of registration:	**Order of Priority for Appr. / Impl.:** 1 (high) [ ] 2 (medium) [ ] 3 (low) [ ]
Attachments: [ ]	**Qualification Status:** Qualified [ ] In process of qualification [ ] N/A) [ ]

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Approved [X] Yes [ ] No Priority [✓]	**Signature** Role Date 2003-01-24	**Reference to SCSB / PSWG decision**

Approved wording if different from box 11 or reason for rejection

Continuation sheet(s) attached
[ ] Yes [ ] No

DOCUMENT CHANGE REQUEST

CONTINUATION SHEET FOR BOX [10]

Change Request No.

Justification

4. Thermal shock conditions changed to meet the maximum operating temperature.
5. Physical dimensions, weight and lead material changed for Variant 06.
6. Test temperature tolerance changed to +/- 0.01°C to meet current manufacturing practices.
7. Table 2 updated for Variant 06.
8. Table 6 updated to include only valid endurance tests.

THERMISTORS

(THERMALLY SENSITIVE RESISTORS), NTC,

RANGE 2 000 TO 100 000 OHMS AT +25°C WITH A TEMPERATURE RANGE OF ~~-40~~ 60 TO +160 °C

ESCC Detail Specification No. 4006/014

ISSUE ~~1~~ 2

~~October 2002~~

2003

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THERMISTORS

(THERMALLY SENSITIVE RESISTORS), NTC,

RANGE 2 000 TO 100 000 OHMS AT +25°C WITH

A TEMPERATURE RANGE OF −40 TO +160 °C

ESA/SCC Detail Specification No. 4006/014

Delete Page from issue 2

space components
coordination group

Issue/Rev.	Date	Approved by	
		SCCG Chairman	ESA Director General or his Deputy
Issue 1	October 1997		
Revision 'A'	June 1999		
Revision 'B'	June 2000		
Revision 'C'	February 2002		

DOCUMENTATION CHANGE NOTICE

(Refer to https://escies.org for ESCC DCR content)

DCR No.	CHANGE DESCRIPTION
~~42~~	Specification upissued to incorporate editorial and technical changes per DCR.
~~45~~	

TABLE OF CONTENTS

1. GENERAL

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics, test and inspection data for Thermistors, Thermally Sensitive Resistors, NTC, Range 2 000 to 100 000 Ohms at +25°C with a Temperature Range of −~~40~~ 65 to +160 °C. It shall be read in conjunction with ESA/SCC Generic Specification No. 4006, the requirements of which are supplemented herein.

1.2 COMPONENT TYPE VARIANTS

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

1.4 PARAMETER DERATING INFORMATION (FIGURE 1)

Not applicable.

1.5 PHYSICAL DIMENSIONS

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

1.6 FUNCTIONAL DIAGRAM

The functional diagram for the thermistors specified herein is 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. 4006, Thermistors (Resistors, Thermally Sensitive).

(c) (b) MIL-STD-202, Test Methods for Electronic and Electrical Component Parts.

(b) IEC 410, Sampling Procedures and Tables for Inspection by Attributes

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. In addition, the following symbols are used:-

NTC = Negative Temperature Coefficient.
R_Z = Zero Power Resistance.

TABLE 1(a) - TYPE VARIANTS

(1) VARIANT	(2) BASED ON TYPE	(3) R_Z (Note 1)		RESISTANCE/TEMPERATURE CHARACTERISTICS (NOTES 2 ~~AND 3~~) (4)									
			−60°C	−40°C	−20°C	0°C	+25°C	+50°C	+70°C	+100°C	+125°C	+140°C	+160°C
01	G2K7D110	NOM. (Ω)	—	43 362	14 658	5 650	2 000,0	815,0	432,0	187.40	102.00	-	-
		TOL. (±%)	—	2.90	2.54	1.57	1.34	1.17	1.05	0.90	1.13	-	-
02	G4K7D108	NOM. (Ω)	—	-	29 316	11 300	4 000	1 630,0	864,0	374.80	204,00	-	-
		TOL. (±%)	—	-	2.54	1.57	1.34	1.17	1.05	0.90	1.13	-	-
03	G4K7D114	NOM. (Ω)	—	86 724	29 316	11 300	4 000	1 630,0	864,0	-	-	-	-
		TOL. (±%)	—	2.90	2.54	1.57	1.34	1.17	1.05	-	-	-	-
04	G15K4D112	NOM. (Ω)	—	-	-	44 235	15 000	5 840	2 985,0	1 226.0	639,0	447,00	287.70
		TOL. (±%)	—	-	-	1.62	1.41	1.24	1.12	0.97	1.23	1.15	1.06
05	G100K6D116	NOM. (Ω)	—	-	-	-	100 000 ~~(X)~~	-	-	5 574	2 642,4	1 756,3	1 059,0
		TOL. (±%)	—	-	-	-	-	-	-	1.11	1.41	1.32	1.21
06	G15K4D393	NOM. (Ω)	134 2000	371 300	120 100	44 420	15 000	5855	3 009.0	1 250.0	659.8	465.50	302.40
		TOL. (±%)	10.00	6.30	3.35	1.00	1.01	1.03	1.05	1.01	1.02	1.02	1.00

NOTES

1. For test purposes, when zero power is dissipated and the ambient temperature is held as specified, the value is referred to as R_Z (Zero Power Resistance).
2. ~~Temperature Tolerance ranges are as follows:-~~
   ~~Variants 01, 02 ,03: ±0.5°C from −40°C to −1°C and +101°C to +125°C.~~
   ~~±0.35°C from 0°C to +100°C.~~
   ~~Variant 04: ±0.5°C from +101°C to +160°C.~~
   ~~±0.35°C from 0°C to +100°C.~~
   ~~Variant 05: ±0.5°C from +101°C to +160°C.~~
   ~~±0.35°C from 0°C to +100°C.~~
2. The refererice resistance is specified at +25°C.
3. For reference purposes only.

TABLE 1(b) - MAXIMUM RATINGS

No.	CHARACTERISTICS	SYMBOL	MAXIMUM RATINGS	UNIT	REMARKS
1	Power Dissipation	P_D	2.0	mW	Note 1
2	Operating Temperature Range	T_{op}	Note 2	°C	
3	Storage Temperature Range	T_{stg}	Note 3	°C	
4	Soldering Temperature	T_{sol}	+245	°C	Note 4

NOTES

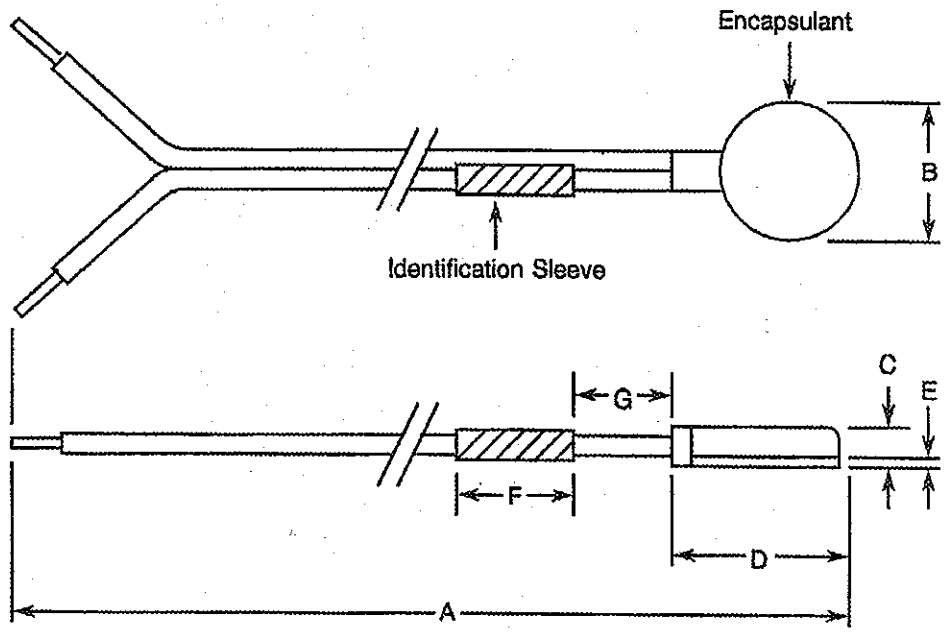
1. Never to be exceeded in the temperature measurement mode. The thermistors specified herein shall not be used in the self-heat mode.
2. See Column 4 of Table 1(a).
3. ~~-55°C to the Maximum Operating Temeprature specified in Column 4 of Table 1(a).~~
4. Duration 10 seconds maximum at a distance of not less than 10mm from the device body and the same lead shall not be resoldered until 3 minutes have elapsed.

3. -40°C for Variants 01 to 05 and -60°C for Variant 06 to the Maximum Operating Temperature specified in Column 4 of Table 1(a).

FIGURE 1 - PARAMETER DERATING INFORMATION

Not applicable.

FIGURE 2 - PHYSICAL DIMENSIONS



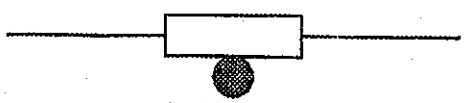
SYMBOL	MILLIMETRES			
	VARIANTS 01 - 05		VARIANT 06	
	MIN	MAX	MIN	MAX
A	280.00	330.00	356.00	406.00
B	6.10	6.60	6.10	6.60
C	-	2.80	-	2.40
D	-	9.80	-	9.80
E	0.33	0.48	0.33	0.48
F	-	50.00	-	50.00
G	50.00	80.00	50.00	80.00

SYMBOL	MILLIMETRES	
	MIN.	MAX.
A	280.00	330.00
B	6.10	6.60
C	-	2.80
D	-	9.80
E	0.33	0.48
F	-	50.00
G	50.00	80.00

NOTES

1. The leads shall not be bent, or the means of fastening them cause bending in any direction from the place of the thermistor fastening disc within a distance of 15mm from the centre of the thermistor.

FIGURE 3 - FUNCTIONAL DIAGRAM



4. REQUIREMENTS

4.1 GENERAL

The complete requirements for procurement of the thermistors specified herein are stated in this specification and ESA/SCC Generic Specification No. 4006 for Thermistors (Resistors, Thermally Sensitive). 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)

~~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. 9.3.1.2, Dissipation Constant: Not applicable.

(b) Para. 9.15, Short Time Load: Not applicable.

(c) Para. 9.17, High Temperature Storage: Not applicable.

4.2.5 Deviations from Lot Acceptance Tests (Chart V)

~~None.~~

4.3 MECHANICAL REQUIREMENTS

4.3.1 Dimension Check

The dimensions of the thermistors specified herein shall be verified in accordance with the requirements set out in Para. 9.4 of ESA/SCC Generic Specification No. 4006 and they shall conform to those shown in Figure 2 of this specification.

4.3.2 Weight

The maximum weight of the thermistors specified herein shall be 4.0 grammes, with the exception of Variant 06, whose maximum weight shall be 2.3 grammes.

4.3.3 Terminal Strength

The requirements for terminal strength testing are specified in Para. 9.13 of ESA/SCC Generic Specification No. 4006. The test conditions shall be as follows:-

Applied Force: 4.45(+1.1 − 0)N.
Duration: 5 seconds.

* (a) Thermal Shock — Test Condition 'C' except that the maximum temperature shall be the maximum operating temperature specified in Column 4 of Table 1(a) of this specification.

*1 (a) Thermal Shock — Test Condition 'C' except that the

maximum temperature shall be the maximum operating temperature specified in Column 4 of Table 1(a) of this specification.

(b) Paragraph 9.3.1.a, Dissipation Constant : Not Applicable
(c) Paragraph 9.15, Short Time Overload : Not Applicable
(d) Paragraph 9.17, High Temperature Storage : Not Applicable

*2 (a) Thermal Shock - Test Condition 'C' except that the maximum temperature shall be the maximum operating temperature specified in Column 4 of Table 1(a) 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 thermistors 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 Case

The housing shall be aluminium filled with a black epoxy encapsulant.

4.4.2 Lead Material and Finish

The lead material shall be in accordance with ESA/SCC Detail Specification No. 3901/012 Variant 04. One lead shall carry an identification sleeve which shall carry all part marking specified in Para. 4.5.

* with the exception of Variant 06, which shall be in accordance with ESA/SCC Detail Specification No. 3901/012 Variant 03.

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 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) The ESA Symbol, for qualified components only.

(b) The SCC Component Number.

(c) Traceability Information.

4.5.2 The SCC Component Number

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

400601401B

Detail Specification Number

Type Variant (see Table 1(a))

Testing Level (B or C, as applicable)

4.5.3 Traceability Information

Each component shall be marked in respect of traceability information 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 at room temperature are scheduled in Table 2. Unless otherwise specified, the measurements shall be performed at T_{amb} = ~~+25±0.05°C~~ +25±0.01°C

4.6.2 Electrical Measurements at High and Low Temperatures

The parameters to be measured at high and low temperatures are scheduled in Table 3. The temperature tolerance shall be +/- 0.01°C.

4.6.3 Circuits for Electrical Measurements (Figure 4)

Not applicable.

4.7 BURN-IN TESTS

4.7.1 Parameter Drift Values +25±0.01°C

The parameter drift values applicable to burn-in are specified in Table 4 of this specification. Unless otherwise stated, measurements shall be performed at T_{amb} = ~~+25±0.05°C~~. The parameter drift values (Δ) applicable to the parameters scheduled, shall not be exceeded. In addition to these drift value requirements for a given parameter, the appropriate limit value specified in Table 2 shall not be exceeded.

4.7.2 Conditions for Burn-in

The requirements for burn-in are specified in Section 7 of ESA/SCC Generic Specification No. 4006. The conditions for burn-in shall be as specified in Table 5 of this specification.

4.7.3 Electrical Circuits for Burn-in (Figure 5)

Not applicable.

TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE - d.c. PARAMETERS (+25+/- 0.01°C)

No.	CHARACTERISTICS	SYMBOL	ESA/SCC 4006 TEST METHOD AND CONDITION	LIMITS		UNIT
				MIN.	MAX.	
1	Zero Power Resistance	R_Z	Para. 9.3.1.1 T_{amb} = +25°C	Note 1		Ω
2	Insulation Resistance	Ri	Para. 9.3.1.4 Note 2	100	-	MΩ
~~4~~ 3	Thermal Time Constant Variants 01-05 Variant 06	KH	Para. 9.3.1.3 In Still Air Note 3	X =	~~20~~ 240 5	sec.

NOTES

1. See Column 4 of Table 1(a) for resistance values.
2. If more than 20 devices have to be measured, the test shall be performed on a sample basis in accordance with Level II, ~~Table IIA, AQL = 1.0 of MIL-STD-105.~~ Single Sampling Plan for Normal Inspection, AQL = 1.0 of IEC 410.
3. Test to be performed on 10 samples during Chart II only.

TABLE 3 - ELECTRICAL MEASUREMENTS AT HIGH AND LOW TEMPERATURES

No.	CHARACTERISTICS	SYMBOL	ESA/SCC 4006 TEST METHOD AND CONDITION	LIMITS		UNIT
				MIN.	MAX.	
1	Zero Power Resistance	R_Z	Para. 9.3.1.1 At each specified temperature, over operating range	Note 1		Ω

NOTES

1. See Column 4 of Table 1(a) for resistance values.

FIGURE 4 - CIRCUITS FOR ELECTRICAL MEASUREMENTS

Not applicable.

TABLE 4 - PARAMETER DRIFT VALUES

No.	CHARACTERISTICS	SYMBOL	SPEC. AND/OR TEST METHOD	TEST CONDITIONS	CHANGE LIMITS (Δ)	UNIT
1	Zero Power Resistance Change	$\frac{\Delta R_Z}{R_Z}$	As per Table 2	As per Table 2 Variants 01 to 06	±0.2	%

TABLE 5 - CONDITIONS FOR BURN-IN AND OPERATING LIFE TESTS

No.	CHARACTERISTICS	SYMBOL	CONDITION	UNIT
1	Ambient Temperature	T_{amb}	Note 1 Note 2	°C
2	Power Dissipation	P_D	2.0	mW

NOTES

1. Maximum Operating Temperature specified in Column 4 of Table 1(a).
2. The Temperture Tolerance = (+0 −3) °C.

FIGURE 5 - ELECTRICAL CIRCUIT FOR BURN-IN AND OPERATING LIFE TESTS

Not applicable.

4.8 ENVIRONMENTAL AND ENDURANCE TESTS (CHARTS IV AND V OF ESA/SCC GENERIC SPECIFICATION No. 4006)

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 2. Unless otherwise stated, the measurements shall be performed at T_{amb} = ~~+25 ± 0.05 °C.~~ + 25 +/− 0.01°C

4.8.2 Measurements and Inspections at Intermediate Points during Endurance Tests

The parameters to be measured and inspections to be performed at intermediate points during endurance tests are scheduled in Table 6. Unless otherwise stated, the measurements shall be performed at T_{amb} = ~~+25 ± 0.05 °C.~~ +25 +/− 0.01°C

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} = ~~+25 ± 0.05 °C.~~ + 25 +/− 0.01°C

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

The requirements for operating life testing are specified in Section 9 of ESA/SCC Generic Specification No. 4006. The conditions for operating life testing shall be as specified in Table 5 for the burn-in test.

4.8.5 Electrical Circuits for Operating Life Tests

Not applicable.

TABLE 6 - MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENTAL TESTS AND AT INTERMEDIATE POINTS AND ON COMPLETION OF ENDURANCE TESTING

No.	ESA/SCC GENERIC SPEC. No. 4006		MEASUREMENTS AND INSPECTIONS		SYMBOL	LIMITS		UNIT
	ENVIRONMENTAL AND ENDURANCE TESTS (1)	TEST METHOD AND CONDITIONS	IDENTIFICATION	CONDITIONS		MIN.	MAX.	
01	Thermal Shock	Para. 9.2 (2)	-	-	-	-	-	-
02	~~Dissipation Constant~~	~~Para. 9.3.1.2 and Para. 4.2.4 of this spec.~~	~~**Initial Measurements** Zero Power Resistance **Final Measurements** Dissipation Constant~~	~~Not applicable Not applicable~~	~~R_Z K_{DISS}~~			
~~03~~ 02	Thermal Time Constant	Para. 9.3.1.3 In Still Air	**Initial Measurements** Zero Power Resistance **Final Measurements** Thermal Time Constant	Para. 9.3.1.3(c) Para. 9.3.1.3(f)	R_Z KH	Record Values -	40	Ω sec.
03 ~~04~~	External Visual Inspection	Para. 9.5	ESA/SCC 20500	-	-	-	-	-
~~05~~ 04	Shock (Specified Pulse)	Para. 9.7	**Initial Measurements** Zero Power Resistance **During Shock** Intermittent Contact **After Shock** Zero Power Resistance Change Visual Examination	Table 2 Item 1 No Open or Short Circuiting Table 2 Item 1 No evidence of damage	R_Z - $\Delta R_Z/R_Z$ -	Table 2 Item 1 - -2.0 -	- +2.0 -	- % -
~~06~~ 05	Vibration	Para. 9.8	**Initial Measurements** Zero Power Resistance **During Vibration** Intermittent Contact **After Vibration** Zero Power Resistance Change Visual Examination	Table 2 Item 1 No Open or Short Circuiting Table 2 Item 1 No evidence of damage	R_Z - $\Delta R_Z/R_Z$ -	Table 2 Item 1 - -2.0 -	- +2.0 -	- % -
06 ~~07~~	Immersion	Para. 9.9	Visual Examination	No evidence of damage	-	-	-	-
~~08~~ 07	Dielectric Withstanding Voltage	Para. 9.10	**During Test** Visual Examination **After Test** Visual Examination	No evidence of breakdown or flashover No evidence of damage, arcing or breakdown	- -	- -	- -	- -
~~09~~ 08	Resistance to Soldering Heat	Para. 9.11	**After Test** Zero Power Resistance Visual Examination	After a recovery period of 24 ± 4 hrs Table 2 Item 1 No evidence of damage	R_Z -	Table 2 Item 1 -	- -	- -
~~10~~ 09	Moisture Resistance	Para. 9.12	**Initial Measurements** Zero Power Resistance **Final Measurements** Zero Power Resistance Change Insulation Resistance	Not less than 1.5 hrs after removal from drying oven Table 2 Item 1 Within 24 hrs of removal from 1.5 to 3.5 hr conditioning Table 2 Item 1 Table 2 Item 2	R_Z $\Delta R_Z/R_Z$ RI	Table 2 Item 1 -2.0 100	+2.0 -	% MΩ

NOTES

1. The tests in this Table refer to either Chart IV or V and shall be used as applicable.
2. Thermal Shock Test Method and Conditions shall use the deviation of this Specification as applicable.

TABLE 6 - MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENTAL TESTS AND AT INTERMEDIATE POINTS AND ON COMPLETION OF ENDURANCE TESTING (CONT'D)

No.	ESA/SCC GENERIC SPEC. No. 4006		MEASUREMENTS AND INSPECTIONS		SYMBOL	LIMITS		UNIT
	ENVIRONMENTAL AND ENDURANCE TESTS (1)	TEST METHOD AND CONDITIONS	IDENTIFICATION	CONDITIONS		MIN.	MAX.	
~~11~~ 10	Terminal Strength	Para. 9.13	**Initial Measurements**					
			Zero Power Resistance	Table 2 Item 1	R_Z	Table 2 Item 1		
			Final Measurements					
			Zero Power Resistance Change	Table 2 Item 1	$\Delta R_Z/R_Z$	−2.0	+2.0	%
			Visual Examination	No evidence of damage	-	-	-	-
~~12~~ 11	Operating Life	Para. 9.14	**Initial Measurements**					
			Zero Power Resistance	Table 2 Item 1	R_Z	Table 2 Item 1		
			Intermediate Measurements					
			Zero Power Resistance Change	Table 2 Item 1	$\Delta R_Z/R_Z$	−1.0	+1.0	%
			Insulation Resistance	Table 2 Item 2	Ri	100	-	MΩ
			Final Measurements					
			Zero Power Resistance Change	Table 2 Item 1	$\Delta R_Z/R_Z$	−1.0	+1.0	%
			Insulation Resistance	Table 2 Item 2	Ri	100	-	MΩ
13	Short Time Load	Para. 9.15	Zero Power Resistance	Table 2 Item 1	R_Z	Table 2 Item 1		
			Visual Examination	No evidence of arcing, burning or charring	-	-	-	-
~~14~~ 12	Low Temperature Storage	Para. 9.16	**Initial Measurements**					
			Zero Power Resistance	Table 2 Item 1	R_Z	Table 2 Item 1		
			Final Measurements					
			Zero Power Resistance Change	Table 2 Item 1	$\Delta R_Z/R_Z$	−2.0	+2.0	%
			Visual Examination	No evidence of damage	-	-	-	-
15	High Temperature Storage	Para. 9.17	**Initial Measurements**					
			Zero Power Resistance	Table 2 Item 1	R_Z	Table 2 Item 1		
			Intermediate Measurements					
			Zero Power Resistance Change	Table 2 Item 1	$\Delta R_Z/R_Z$	−1.0	+1.0	%
			Insulation Resistance	Table 2 Item 2	Ri	100	-	MΩ
			Final Measurements					
			Zero Power Resistance Change	Table 2 Item 1	$\Delta R_Z/R_Z$	−1.0	+1.0	%
			Insulation Resistance	Table 2 Item 2	Ri	100	-	MΩ
13 ~~16~~	Solderability	Para. 9.18	-	-	-	-	-	-
17	Permanance of Marking	Para. 9.20	ESA/SCC 24800	-	-	-	-	-

NOTES

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

APPENDIX 'A'

AGREED DEVIATIONS FOR BETATHERM (IRL)

ITEMS AFFECTED	DESCRIPTION OF DEVIATION
Para. 4.2.4	(a) Para. 9.2, Thermal Shock: May be performed as follows: "Test Condition 'C' except that the maximum temperature shall be the maximum operating temperature specified in Column 4 of Table 1(a) of this specification." (b) Para. 9.17, High Temperature Storage: May be omitted.
Para. 4.2.5	(a) Para. 9.2, Thermal Shock: May be performed as follows: "Test Condition 'C' except that the maximum temperature shall be the maximum operating temperature specified in Column 4 of Table 1(a) of this specification."