ISOLATORS, MINIATURE DROP-IN

4.0 - 18 GHz

BASED ON SERIES F9*XXXX AND H9*XXXX

ESCC Detail Specification No. 3202/025

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ESA/SCC Detail Specification No. 3202/025

space components
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DOCUMENTATION CHANGE NOTICE

Rev. Letter	Rev. Date	Reference	CHANGE Item	Approved DCR No.
		This Issue supersedes Issue 1 and incorporates all changes agreed in the following DCR's:-		
		Cover page		None
		DCN		None
		Table 1(a)	: Figure numbers amended	23774
			: Tab Material and Finish column added	23774
		Table 1(b)	: No. 1, in Maximum Ratings "12" amended to "8.0"	23774
			, Remarks deleted and Note references added	23774
			: No. 5, in Maximum Ratings, Note reference amended	23774
			: No. 7, in Remarks, Note reference amended	23774
			: New Notes 1 and 2 added	23774
			: Existing Notes 1 and 2 renumbered as "3" and "4"	23774
		Figures 2	: Renumbered as "2(a)" to "2(d)"	23774
			: Note 2 deleted	23774
		Para. 4.3.3	: Figure number references amended	23774
		Para. 4.4.4	: Existing text deleted and new text added	23774

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TABLES

FIGURES

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 an Isolator, Miniature Drop-in, 4.0 - 18 GHz, based on Series F9*XXXX and H9*XXXX. It shall be read in conjunction with ESA/SCC Generic Specification No. 3202, the requirements of which are supplemented herein.

1.2 COMPONENT TYPE VARIANTS

Variants of the basic type isolators 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 isolators specified herein, are as scheduled in Table 1(b).

1.4 PHYSICAL DIMENSIONS

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

1.5 FUNCTIONAL DIAGRAM

The functional diagram, showing port identification of the isolators 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. 3202, Ferrite Microwave Components, Isolators and Circulators.

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

(1) VARIANT	(2) BASED ON TYPE	(3) CENTRE FREQ. (f_c) (GHz)	(4) MIN. BANDWIDTH (B) (GHz)	(5) MINIMUM ISOLATION (ISO) (dB)	(6) MAXIMUM INSERTION LOSS (IL) (dB)	(7) MINIMUM RETURN LOSS		(8) OPERATING TEMP. RANGE		(9) FIGURE	(10) CONFIG. AND FUNCT. DIAG.	(11) TAB MATER. AND FINISH
						INPUT (RL_{IN}) (dB)	OUTPUT (RL_{OUT}) (dB)	MIN. (°C)	MAX. (°C)			
01	F9*2001	14.0	4.0	17.0	0.7	14.0	14.0	−54	+95	2(a)	3(a)	M7
02	F9*9001	8.153	0.1	20.0	0.4	19.1	19.1	−20	+80	2(a)	3(a)	M7
03	F9*9001	8.153	0.1	20.0	0.4	19.1	19.1	−20	+80	2(c)	3(b)	M7
04	F9*2001	14.0	4.0	17.0	0.7	14.0	14.0	−54	+95	2(a)	3(b)	M4
05	F9*9001	8.153	0.1	20.0	0.4	19.1	19.1	−20	+80	2(a)	3(a)	M4
06	H9*2001	14.0	4.0	17.0	0.7	14.0	14.0	−54	+95	2(b)	3(b)	M4
07	H9*2001	14.0	4.0	17.0	0.7	14.0	14.0	−54	+95	2(b)	3(a)	M7
08	H9*9001	8.153	0.1	20.0	0.4	19.1	19.1	−20	+80	2(d)	3(a)	M7
09	H9*9001	8.153	0.1	20.0	0.4	19.1	19.1	−20	+80	2(d)	3(b)	M4

TABLE 1(b) - MAXIMUM RATINGS

No.	CHARACTERISTICS	SYMBOL	MAXIMUM RATINGS	UNIT	REMARKS
1	Frequency Range	-	8.0 to 18 4.0 to 12	GHz	Note 1 Note 2
2	Peak RF Power Peak RF Power Duration Peak RF Power Duty Cycle	P_p - -	50 50 1.0	W µs %	-
3	Rated RF Power (Continuous Reflected)	P	0.5	W	-
4	Load RF Power (Peak Reflected) Load RF Power Duration Load RF Power Duty Cycle	P_L - -	5.0 50 1.0	W µs %	-
5	Operating Temperature Range	T_{op}	Note 3	°C	T_{amb}
6	Storage Temperature Range	T_{stg}	−60 to +125	°C	-
7	Maximum Tab Soldering Temperature	T_{sol}	+240	°C	Note 4

NOTES

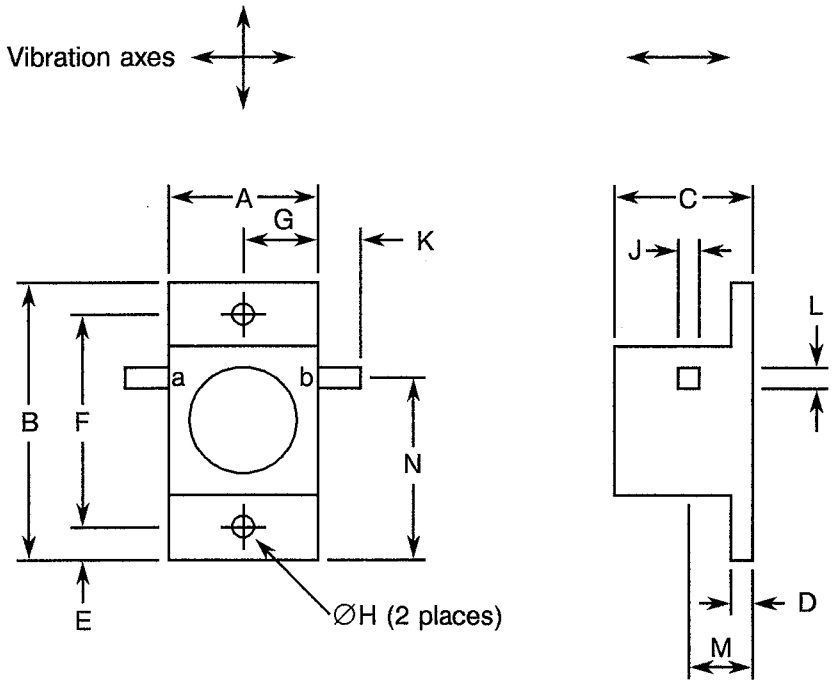
1. Figures 2(a) and 2(b).
2. Figures 2(c) and 2(d).
3. The Operating Temperature Range for a Type Variant shall be as specified in Column 8 of Table1(a). The Operating Temperature Range shall not exceed the Storage Temperature Range.
4. Duration 5 seconds maximum at a distance of not less than 1.5mm from the body and the same termination shall not be resoldered until 3 minutes have elapsed.

FIGURE 1 - PARAMETER DERATING INFORMATION

Not applicable.

FIGURE 2 - PHYSICAL DIMENSIONS

FIGURE 2(a) - 1/4" FLANGED



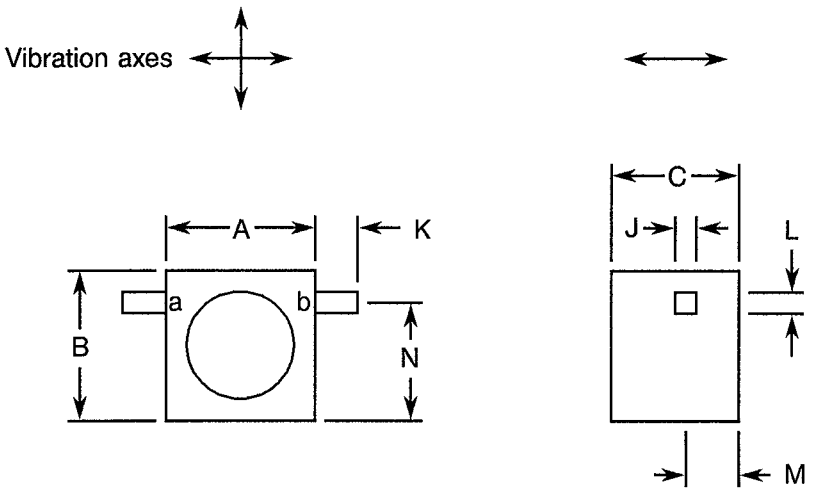
SYMBOL	MILLIMETRES	
	MIN.	MAX.
A	-	6.40
B	-	12.82
C	-	4.82
D	-	1.27
E	1.39	1.65
F	9.52	9.78
G	3.05	3.30
ØH	2.00	2.40
J	0.10	0.15
K	1.27	2.29
L	0.51	0.76
M	1.27	1.52
N	7.62	8.13

NOTES

1. The input and output ports shall be marked as specified in Figure 3.

FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(b) - 1/4" FLANGELESS



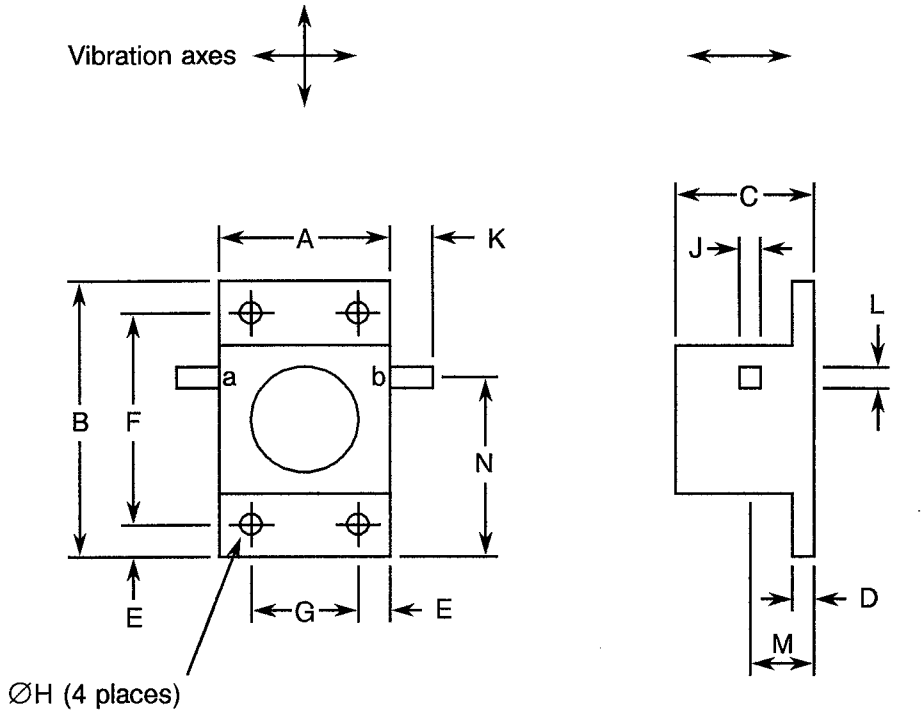
SYMBOL	MILLIMETRES	
	MIN.	MAX.
A	-	6.48
B	-	6.48
C	-	3.81
J	0.10	0.15
K	1.27	2.29
L	0.51	0.76
M	1.65	1.91
N	4.44	4.70

NOTES

1. The input and output ports shall be marked as specified in Figure 3.

FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(c) - 3/8" FLANGED



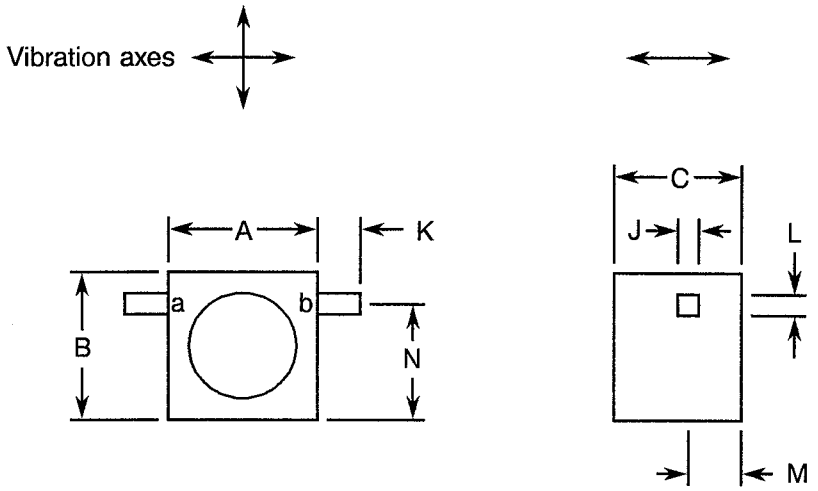
SYMBOL	MILLIMETRES	
	MIN.	MAX.
A	-	9.65
B	-	16.00
C	-	5.59
D	-	1.27
E	1.39	1.65
F	12.70	12.95
G	6.35	6.60
ØH	2.00	2.40
J	0.10	0.15
K	1.27	2.29
L	0.51	0.76
M	1.27	1.52
N	10.16	10.41

NOTES

1. The input and output ports shall be marked as specified in Figure 3.

FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(d) - 3/8" FLANGELESS



SYMBOL	MILLIMETRES	
	MIN.	MAX.
A	-	9.65
B	-	9.78
C	-	5.59
J	0.10	0.15
K	1.27	2.29
L	0.51	0.76
M	1.65	1.91
N	6.98	7.24

NOTES

1. The input and output ports shall be marked as specified in Figure 3.

FIGURE 3 - FUNCTIONAL DIAGRAM

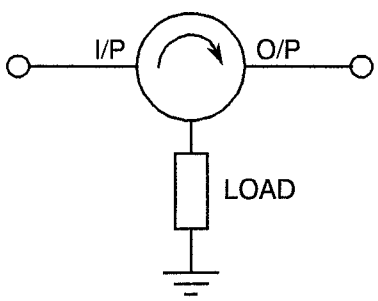


FIGURE	PORT	
	a	b
3(a)	I/P	O/P
3(b)	O/P	I/P

4. REQUIREMENTS

4.1 GENERAL

The complete requirements for procurement of the isolators specified herein shall be as stated in this specification and ESA/SCC Generic Specification No. 3202. 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. 9.7.1.6, Voltage Proof: Shall not be performed.

(b) Para. 9.6, Seal Test: Shall not be performed.

(c) Para. 9.8, Coupling Proof Torque: Shall not be performed.

(d) Para. 9.9, Mating and Unmating Forces: Shall not be performed.

(e) Para. 9.10, Centre Contact Retention: Shall not be performed.

(f) Para. 9.11, RF Leakage: Shall not be performed.

(g) Para. 9.12, Multipaction: Shall not be performed.

(h) Para. 9.13, Contact Engagement and Separation Forces: Shall not be performed.

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

None.

4.2.4 Deviations from Qualification Tests (Chart IV)

(a) Para. 9.8, Coupling Proof Torque: Shall not be performed.

(b) Para. 9.20, Endurance: Shall not be performed.

(c) Para. 9.6, Seal Test: Shall not be performed.

4.2.5 Deviations from Lot Acceptance Tests (Chart V)

(a) Para. 9.8, Coupling Proof Torque: Shall not be performed.

(b) Para. 9.20, Endurance: Shall not be performed.

(c) Para. 9.6, Seal Test: Shall not be performed.

(d) Para. 9.9, Mating and Unmating Forces: Shall not be performed.

(e) Para. 9.13, Contact Engagement and Separation Forces: Shall not be performed.

4.3 MECHANICAL REQUIREMENTS

4.3.1 Contact Engagement and Separation Forces

Not applicable.

4.3.2 Voltage Proof

Not applicable.

4.3.3 Weight

The maximum weight of the components specified herein shall be as follows:-

Figure 2(a) : 3.0g.
Figure 2(b) : 2.0g.
Figure 2(c) : 5.0g.
Figure 2(d) : 4.0g.

4.3.4 Coupling Proof Torque

Not applicable.

4.3.5 Mating and Unmating Forces

Not applicable.

4.3.6 Centre Contact Retention

Not applicable.

4.3.7 Dimension Check

The dimensions of the components specified herein shall be verified in accordance with the requirements set out in Para. 9 of ESA/SCC Generic Specification No. 3202 and shall conform to those shown in Figure 2.

4.3.8 Endurance

Not applicable.

4.4 MATERIALS AND FINISHES

4.4.1 General

The materials and finishes shall be as specified herein. Where a definite material is not specified, a material which will enable the components 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.

4.4.2 Body

Stainless Steel, plated 3.0μm (min) nickel.

4.4.3 Connector Receptacle

Not applicable.

4.4.4 Tab Material and Finish

The tab material shall be Type 'M' with either Type '4' or Type '7' finish in accordance with the requirements of ESA/SCC Basic Specification No. 23500. (See Table 1(a) for Type Variants).

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. Each component shall be marked in respect of:-

(a) Input and Output Port Identification.

(b) The SCC Component Number.

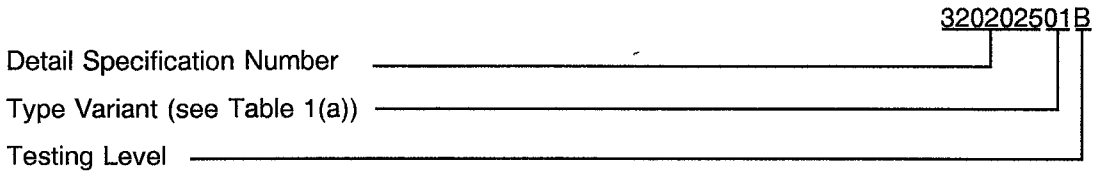
(c) Traceability Information.

4.5.2 Input and Output Port Identification

Input and Output Port identification shall be as shown in Table 1(a) and Figure 3.

4.5.3 The SCC Component Number

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



4.5.4 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. The measurements shall be performed at $T_{amb} = +22 \pm 3$ °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. Measurements shall be performed at the temperature extremes as defined in Column 8 of Table 1(a).

4.6.3 Circuits for Electrical Measurements

Circuits for use in performing electrical measurements are given in ESA/SCC Generic Specification No. 3202.

4.7 BURN-IN TESTS

Not applicable.

TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE

No.	CHARACTERISTICS	SYMBOL	ESA/SCC 3202 TEST METHOD AND CONDITION	LIMITS	
				MIN.	MAX.
1	Isolation	ISO	Para. 9.7.1.2	Table 1(a) Column 5	
2	Insertion Loss	IL	Para. 9.7.1.3	Table 1(a) Column 6	
3	Return Loss Input Output	RL_{IN} RL_{OUT}	Para. 9.7.1.4	Table 1(a) Column 7	

TABLE 3 - ELECTRICAL MEASUREMENTS AT HIGH AND LOW TEMPERATURES

No.	CHARACTERISTICS	SYMBOL	ESA/SCC 3202 TEST METHOD AND CONDITION	LIMITS	
				MIN.	MAX.
1	Isolation	ISO	Para. 9.7.1.2	Table 1(a) Column 5	
2	Insertion Loss	IL	Para. 9.7.1.3	Table 1(a) Column 6	
3	Return Loss Input Output	RL_{IN} RL_{OUT}	Para. 9.7.1.4	Table 1(a) Column 7	

FIGURE 4 - CIRCUITS FOR ELECTRICAL MEASUREMENTS

Not applicable.

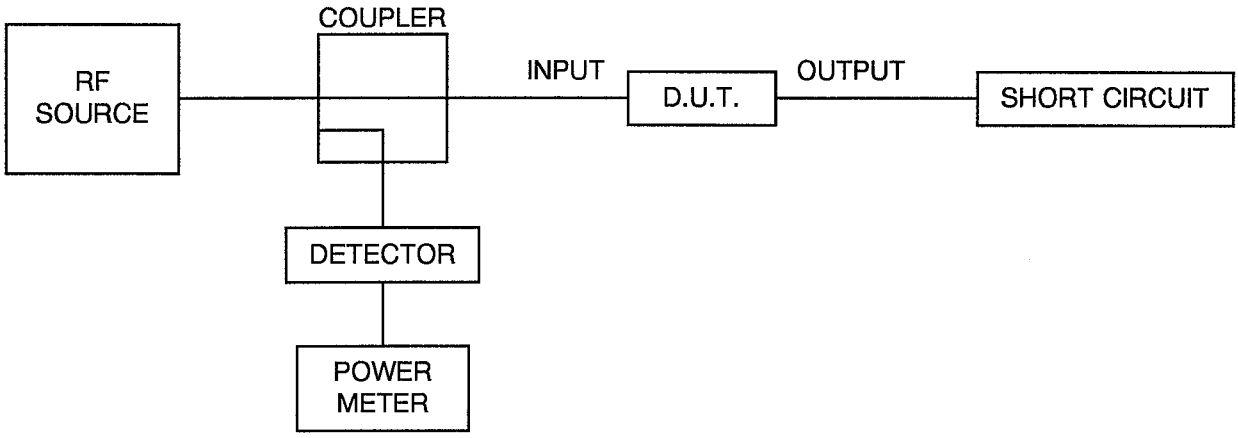
TABLE 4 - PARAMETER DRIFT VALUES

Not applicable.

TABLE 5 - CONDITIONS FOR OPERATING LIFE TEST

No.	CHARACTERISTICS	SYMBOL	CONDITION	UNIT
1	Centre Frequency	f_c	Table 1(a) Column 3	GHz
2	Input Power	P	0.5	W
3	Ambient Temperature	T_{amb}	Higher Temperature of Table 1(a) Column 8	°C

FIGURE 5 - ELECTRICAL CIRCUIT FOR OPERATING LIFE TEST



4.8 ENVIRONMENTAL AND ENDURANCE TESTS (CHARTS IV AND V OF ESA/SCC GENERIC SPECIFICATION NO. 3202)

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 $T_{amb} = +22 \pm 3$ °C.

4.8.2 Measurements and Inspections at Intermediate Points and on Completion of Endurance Tests

The parameters to be measured and inspections to be performed at intermediate points and on completion of endurance tests are scheduled in Table 6. 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)

The requirements for operating life testing are specified in Section 9 of ESA/SCC Generic Specification No. 3202. The conditions for operating life testing shall be as specified in Table 5 of this specification.

4.8.4 Electrical Circuits for Operating Life Tests

Circuits for use in performing the operating life tests are shown in Figure 5 of this specification.

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

No.	ESA/SCC GENERIC SPECIFICATION NO. 3202		MEASUREMENTS AND INSPECTIONS		SYMBOL	LIMITS	UNIT
	ENVIRONMENTAL AND ENDURANCE TESTS (1)	TEST METHOD AND CONDITIONS	IDENTIFICATION	CONDITIONS			
01	Rapid Change of Temperature	Para. 9.4	Electrical Measurements Visual Examination	Table 2 -		Table 1(a) -	
02	Vibration	Para. 9.5	Electrical Measurements Visual Examination	Table 2 -		Table 1(a) -	
03	Shock or Bump	Para. 9.16	Electrical Measurements Visual Examination	Table 2 -		Table 1(a) -	
04	Permanence of Marking	Para. 9.17	Visual Examination	-		-	
05	Climatic Sequence Dry Heat Cold Test Low Air Pressure Damp Heat	Para. 9.18 Para. 9.18.2 Para. 9.18.4 Para. 9.18.5 Para. 9.18.6	 Electrical Measurements Electrical Measurements 3202, Para. 9.18.5 Electrical Measurements	 Table 3 Table 3 - Table 2		 Table 1(a) Table 1(a) 3202, Para. 9.18.5 Table 1(a)	
06	Corrosion	Para. 9.19	Visual Examination	-		-	
07	Coupling Proof Torque	Para. 9.8	Not applicable	-		-	
08	Endurance	Para. 9.20	Not applicable	-		-	
09	Solderability	Para. 9.21	Visual Examination	-		-	
10	Robustness of Terminations	Para. 9.22	Visual Examination	-		-	
11	Seal Test	Para. 9.6	Not applicable	-		-	
12	Damp Heat	Para. 9.23	Electrical Measurements Visual Examination	Table 2 -		Table 1(a) -	
13	Operating Life	Para. 9.24.1 Para. 9.24.4 Para. 9.24.5	Init. Elec. Measurements Inter. Elec. Measurements Final Elec. Measurements	Table 2 Table 2 Table 2		Table 1(a) Table 1(a) Table 1(a)	
14	Mating and Unmating Forces	Para. 9.9	Visual Examination	-		-	
15	Contact Engagement and Separation Forces	Para. 9.13	Visual Examination	-		-	

NOTES

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