ISOLATORS, COAXIAL/DROP-IN

420 MHz - 18 GHz

BASED ON SERIES 20*XXXX AND 29*XXXX

ESCC Detail Specification No. 3202/019

ISSUE 1

October 2002

Document Custodian: European Space Agency - see https://escies.org

LEGAL DISCLAIMER AND COPYRIGHT

european space agency
agence spatiale européenne

Pages 1 to 23

ISOLATORS, COAXIAL/DROP-IN

420 MHz - 18 GHz

BASED ON SERIES 20*XXXX AND 29*XXXX

ESA/SCC Detail Specification No. 3202/019

space components
coordination group

Issue/Rev.	Date	Approved by	
		SCCG Chairman	ESA Director General or his Deputy
Issue 1	March 1994		
Revision 'A'	April 1995		

DOCUMENTATION CHANGE NOTICE

Rev. Letter	Rev. Date	Reference	CHANGE Item	Approved DCR No.
'A'	April '95	P1. Cover page		None
		P2. DCN		None
		P7. Table 1(a)	: Correction of typographical errors	23670
			: Variant 25 added	221242
			: Variant 26 added	221257
		P9. Figures 2(a) to 2(c)	: Dimension 'G' corrected in drawing	23699
		P11. Figures 2(e) to 2(f)	: Dimension 'G' corrected in drawing	23699
		P13. Figure 2(h)	: Dimension 'G' corrected in drawing	23699
		P14. Figure 2(i))	: Dimension 'G' corrected in drawing	23699
		P15. Figure 2(j)	: Dimension 'G' corrected in drawing	23699

TABLE OF CONTENTS

Page

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, Coaxial/Drop-in, 420 MHz - 18 GHz, based on Series 20*XXXX and 29*XXXX. It shall be read in conjunction with ESA/SCC Generic Specification No. 3202, the requirements of which are supplemented herein.

1.2 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.

(b) ESA/SCC Detail Specification No. 3402/001, RF Coaxial Connectors type SMA (Male Contact).

(c) ESA/SCC Detail Specification No. 3402/002, RF Coaxial Connectors type SMA (Female Contact).

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) INTERFACES (NOTE 1)		(9) OPERATING TEMP. RANGE		(10) FIGURE	(11) CONFIG. AND FUNCT. DIAG.
						INPUT RL_{IN} (dB)	OUTPUT RL_{OUT} (dB)	INPUT	OUTPUT	MIN. (°C)	MAX. (°C)		
01	20*6601	7.4	0.6	20.0	0.5	19.1	19.1	SMA(F)	M4 TAB	−54	+95	2(d)	3(e)
02	20*6601	7.4	0.6	20.0	0.5	19.1	19.1	SMA(M)	M4 TAB	−54	+95	2(d)	3(f)
03	20*6601	7.4	0.6	20.0	0.5	19.1	19.1	SMA(F)	SMA(M)	−54	+95	2(d)	3(e)
04	20*2501	15.0	6.0	20.0	0.5	19.1	19.1	SMA(F)	SMA(M)	−54	+95	2(d)	3(e)
05	29*1601	1.667	0.1	20.0	0.5	19.1	19.1	M7 TAB	M7 TAB	−20	+80	2(e)	3(a)
06	29*1601	1.667	0.1	20.0	0.5	19.1	19.1	M7 TAB	M7 TAB	−20	+80	2(e)	3(b)
07	29*1601	1.704	0.1	20.0	0.5	19.1	19.1	M7 TAB	M7 TAB	−20	+80	2(e)	3(a)
08	29*1601	1.704	0.1	20.0	0.5	19.1	19.1	M7 TAB	M7 TAB	−20	+80	2(e)	3(b)
09	20*2001	8.153	0.1	20.0	0.4	19.1	19.1	SMA(M)	SMA(F)	−20	+80	2(d)	3(c)
10	20*2001	8.153	0.1	20.0	0.4	19.1	19.1	SMA(M)	SMA(F)	−20	+80	2(d)	3(f)
11	29*1401	2.25	0.1	20.0	0.5	19.1	19.1	M7 TAB	M7 TAB	−40	+80	2(e)	3(d)
12	29*1401	2.25	0.1	20.0	0.5	19.1	19.1	M7 TAB	M7 TAB	−40	+80	2(e)	3(c)
13	20*2001	8.153	0.1	20.0	0.4	19.1	19.1	SMA(M)	SMA(F)	−20	+80	2(d)	3(a)
14	20*2001	8.153	0.1	20.0	0.4	19.1	19.1	SMA(M)	SMA(F)	−20	+80	2(d)	3(b)
15	29*1601	1.704	0.02	20.0	0.3	19.1	19.1	M7 TAB	M7 TAB	−20	+70	2(e)	3(a)
16	29*1601	1.704	0.02	20.0	0.3	19.1	19.1	M7 TAB	M7 TAB	−20	+70	2(e)	3(b)

NOTES

1. Interfaces are defined as follows:-

   Connectors: "SMA(F)" = SMA Female, "SMA(M)" = SMA Male.
   Tabs: "M4 TAB" or "M7 TAB" in accordance with Para. 4.4.4 of this specification.

2. The Insulation Resistance for devices without resistive loads shall be 5.0MΩ minimum.

TABLE 1(a) - TYPE VARIANTS (CONTINUED)

(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) INTERFACES (NOTE 1)		(9) OPERATING TEMP. RANGE		(10) FIGURE	(11) CONFIG. AND FUNCT. DIAG.
						INPUT RL_{IN} (dB)	OUTPUT RL_{OUT} (dB)	INPUT	OUTPUT	MIN. (°C)	MAX. (°C)		
17	20*1601	1.704	0.1	20.0	0.5	19.1	19.1	SMA(F)	SMA(F)	−54	+95	2(g)	3(b)
18	29*1601	1.667	0.1	20.0	0.5	19.1	19.1	M7TAB	M7TAB	−20	+80	2(f)	3(c)
19	29*6601	7.4	0.6	20.0	0.5	19.1	19.1	M7TAB	M7TAB	−54	+95	2(b)	3(d)
20	29*6601	7.4	0.6	20.0	0.5	19.1	19.1	M7TAB	M7TAB	−54	+95	2(a)	3(f)
21	29*6601	7.4	0.6	20.0	0.5	19.1	19.1	M7TAB	M7TAB	−54	+95	2(c)	3(e)
22	29*1401	1.2	0.12	20.0	0.5	19.1	19.1	M7TAB	M7TAB	−54	+95	2(i)	3(a)
23	20*1401	1.2	0.12	20.0	0.5	19.1	19.1	SMA(F)	SMA(F)	−54	+95	2(h)	3(b)
24	29*0701	0.43	0.04	20.0	0.5	19.1	19.1	M7TAB	M7TAB	−54	+95	2(j)	3(c)
25	20*2001	11.95	0.11	30.0	0.3	23	23	SMA(F)	SMA(F)	−10	+60	2(d)	3(b)
26	20*0001	0.425	0.01	17.0	0.5	17	17	SMA(F)	SMA(M)	−54	+95	2(j)	3(e)

NOTES

1. Interfaces are defined as follows:-

   Connectors: "SMA(F)" = SMA Female, "SMA(M)" = SMA Male.
   Tabs: "M4 TAB" or "M7 TAB" in accordance with Para. 4.4.4 of this specification.

2. The Insulation Resistance for devices without resistive loads shall be 5.0MΩ minimum.

TABLE 1(b) - MAXIMUM RATINGS

No.	CHARACTERISTICS	SYMBOL	MAXIMUM RATINGS	UNIT	REMARKS
1	Frequency Range	-	2.5 to 18 1.65 to 3.7 0.5 to 1.65 0.42 to 1.215	GHz GHz GHz GHz	Figure 2(a) to (d) Figure 2(e) to (g) Figure 2(h) to (i) Figure 2(j)
2	Peak RF Power Peak RF Power Duration Peak RF Power Duty Cycle	P_p - -	200 1000 50 25 50 15	W W µs % % %	Figure 2(a) to (i) Figure 2(j) - Figure 2(a) to (g) Figure 2(h) to (i) Figure 2(j)
3	Rated RF Power (Continuous Reflected)	P	0.5 1.0 1.5	W W W	Figure 2(a) to (g) Figure 2(h) to (i) Figure 2(j)
4	Load RF Power (Reflected) Load RF Power Duration Load RF Power Duty Cycle	P_L - -	2.0 10 50 25 50 15	W W µs % % %	Figure 2(a) to (i) Figure 2(j) - Figure 2(a) to (g) Figure 2(h) to (i) Figure 2(j)
5	Minimum RF Leakage	E	- 70	dBc	Note 1
6	Operating Temperature Range	T_{op}	Note 2	°C	T_{amb}
7	Storage Temperature Range	T_{stg}	- 60 to + 125	°C	-
8	Maximum Tab Soldering Temperature	T_{sol}	+ 240	°C	Note 3

NOTES

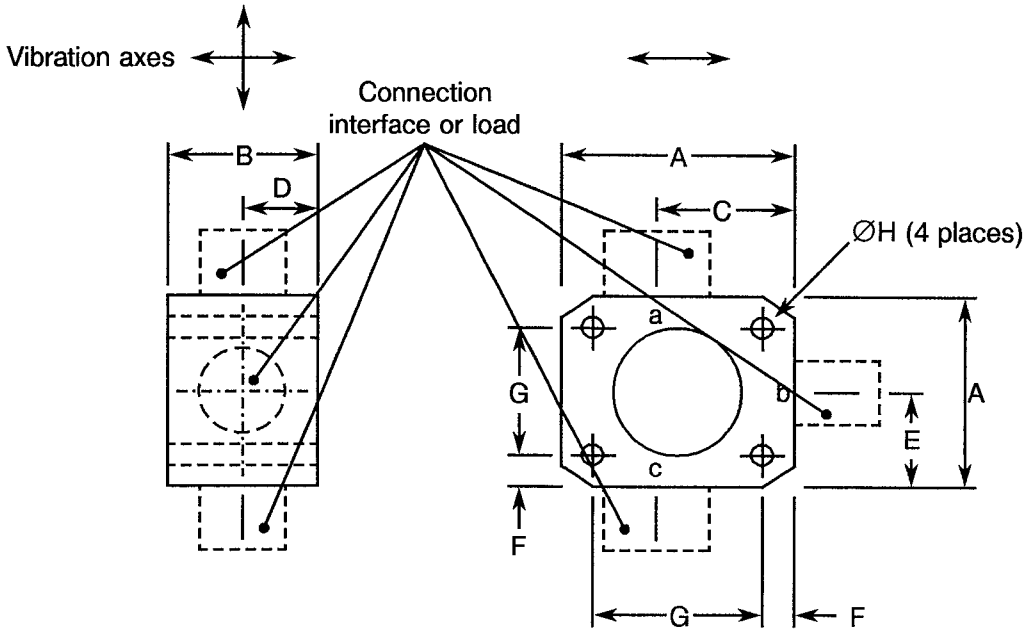
1. This parameter is not applicable to devices with one, or more, tab connections.
2. The Operating Temperature Range for a Type Variant shall be as specified in Column 9 of Table1(a). The Operating Temperature Range shall not exceed the Storage Temperature Range.
3. Duration 5 seconds maximum at a distance 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

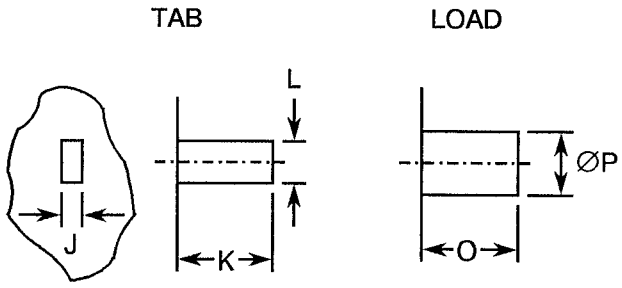
Not applicable.

FIGURE 2 - PHYSICAL DIMENSIONS

FIGURES 2(a) TO 2(c) - 1/2" DROP-IN



Connection interface or load as follows:



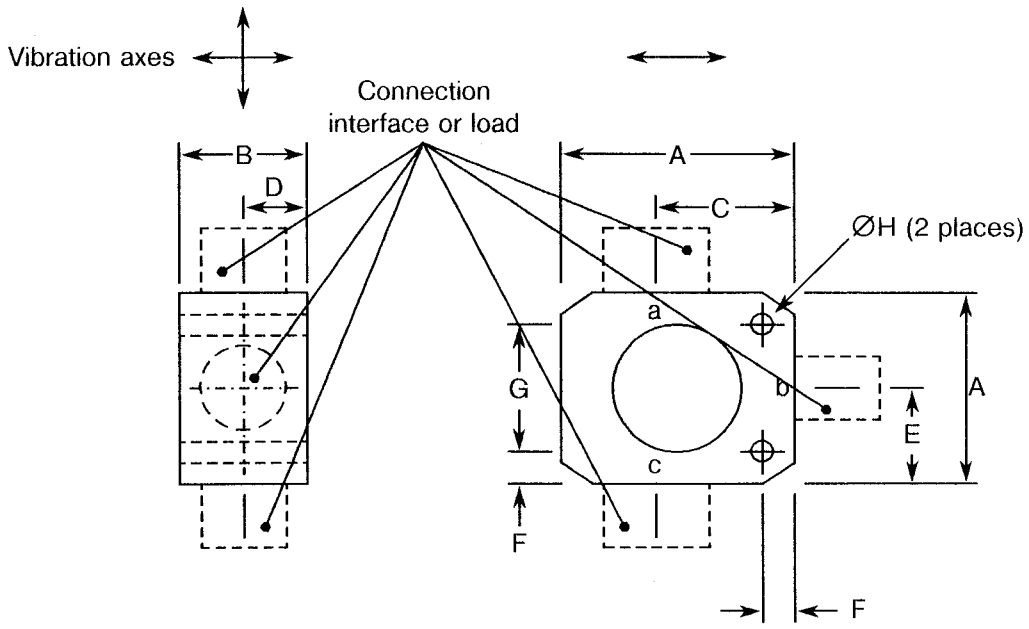
SYMBOL	MILLIMETRES		NOTES
	MIN.	MAX.	
A	-	12.95	
B	-	6.60	
C	8.13	8.64	
D	2.92	3.18	Figure 2(a)
	2.16	2.41	Figure 2(b)
	1.78	2.03	Figure 2(c)
E	6.10	6.60	
F	1.27	1.78	
G	9.40	9.91	
ØH	1.75	2.05	
J	0.10	0.15	
K	1.27	2.29	
L	0.51	0.76	
O	-	5.85	
ØP	-	5.08	

NOTES

1. Ports shall be marked as specified in Figure 3.

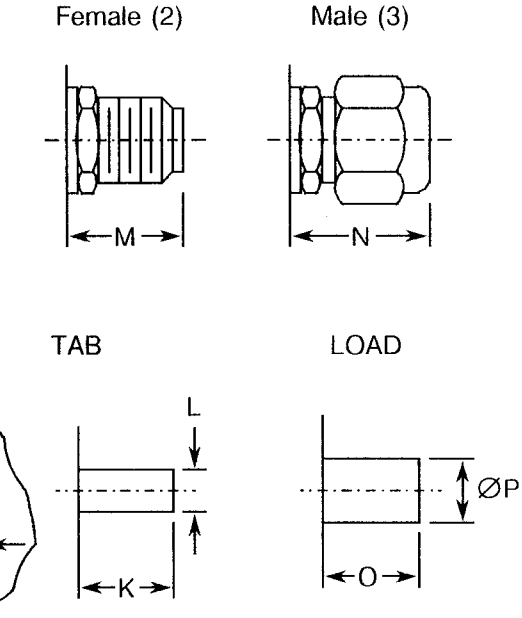
FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(d) - 1/2" CONNECTORISED/DROP-IN



SYMBOL	MILLIMETRES	
	MIN.	MAX.
A	-	12.95
B	-	12.95
C	8.13	8.64
D	6.10	6.60
E	6.10	6.60
F	1.27	1.78
G	9.40	9.91
ØH	1.75	2.05
J	0.10	0.15
K	1.27	2.29
L	0.51	0.76
M	-	9.02
N	-	11.30
O	-	8.89
ØP	-	6.60

Connection interface or load as follows:
SMA

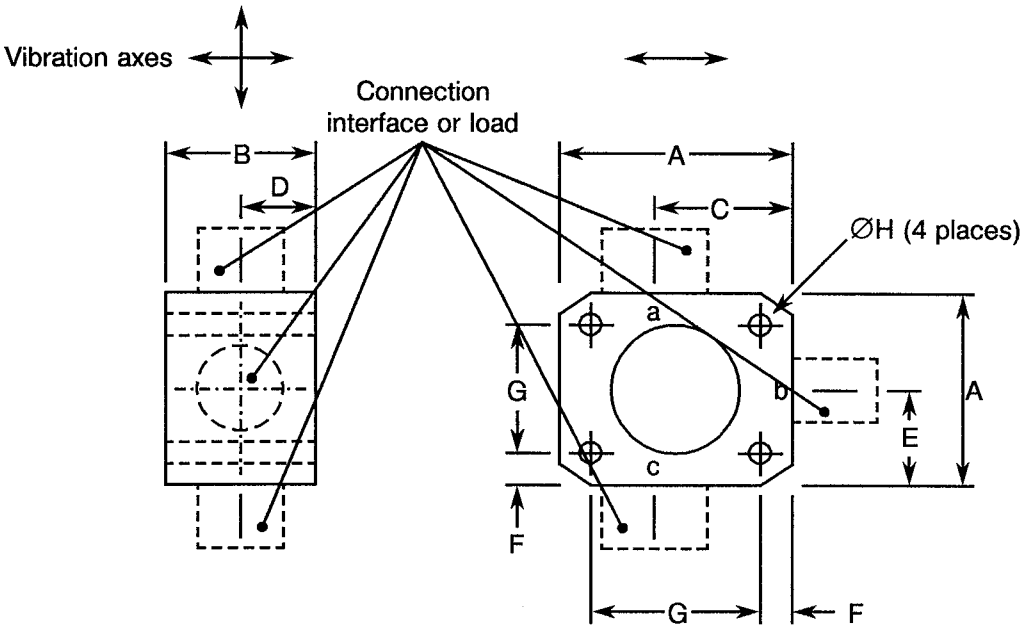


NOTES

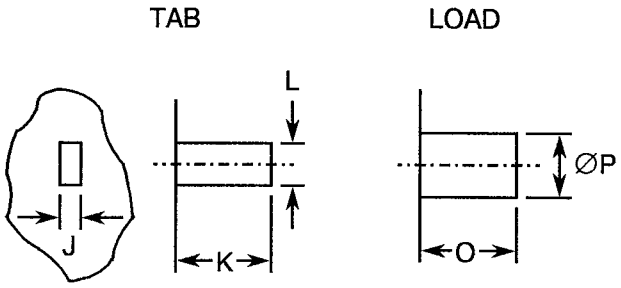
1. Ports shall be marked as specified in Figure 3.
2. Full dimensions of the Female SMA interface are specified in ESA/SCC Detail Specification No. 3402/002.
3. Full dimensions of the Male SMA interface are specified in ESA/SCC Detail Specification No. 3402/001.

FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURES 2(e) TO 2(f) - 3/4" DROP-IN



Connection interface or load as follows:



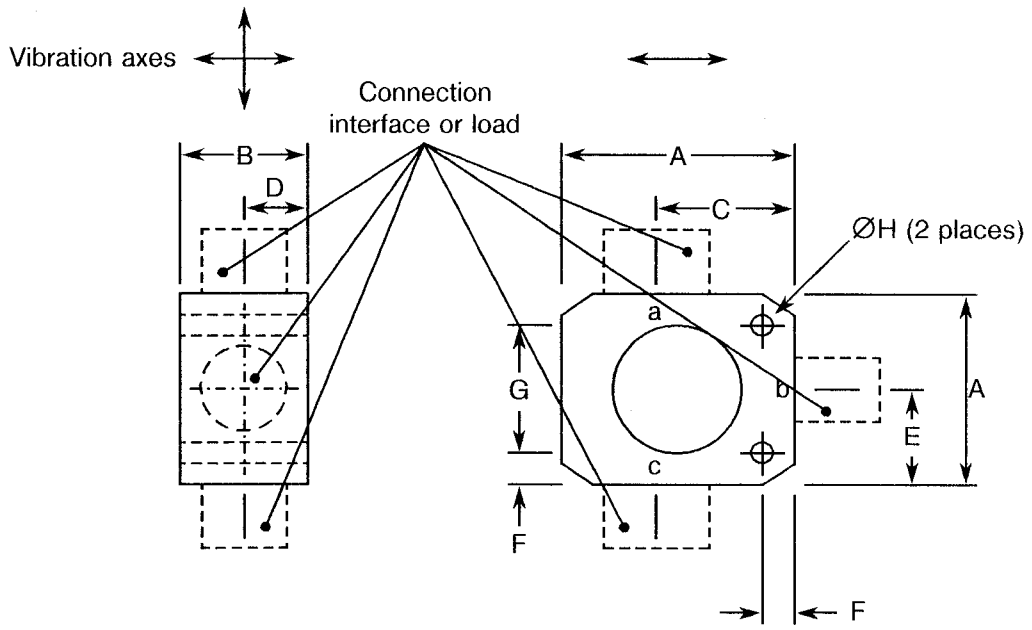
SYMBOL	MILLIMETRES		NOTES
	MIN.	MAX.	
A	-	19.30	
B	-	6.60	
C	12.57	13.08	
D	2.92	3.18	Figure 2(e)
	2.41	2.67	Figure 2(f)
E	9.40	9.65	
F	0.20	0.25	
G	14.22	14.73	
ØH	1.88	2.18	
J	0.10	0.15	
K	1.27	2.29	
L	0.51	0.76	
O	-	5.85	
ØP	-	5.08	

NOTES

1. Ports shall be marked as specified in Figure 3.

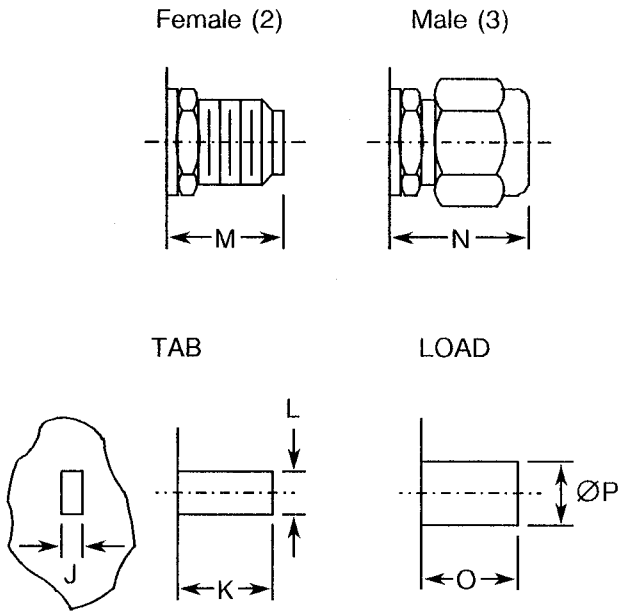
FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(g) - 3/4" CONNECTORISED/DROP-IN



SYMBOL	MILLIMETRES	
	MIN.	MAX.
A	-	19.30
B	-	12.95
C	12.57	13.08
D	6.10	6.60
E	9.40	9.65
F	0.20	0.25
G	14.22	14.73
ØH	1.88	2.18
J	0.10	0.15
K	1.27	2.29
L	0.51	0.76
M	-	9.02
N	-	11.30
O	-	8.89
ØP	-	6.60

Connection interface or load as follows:
SMA

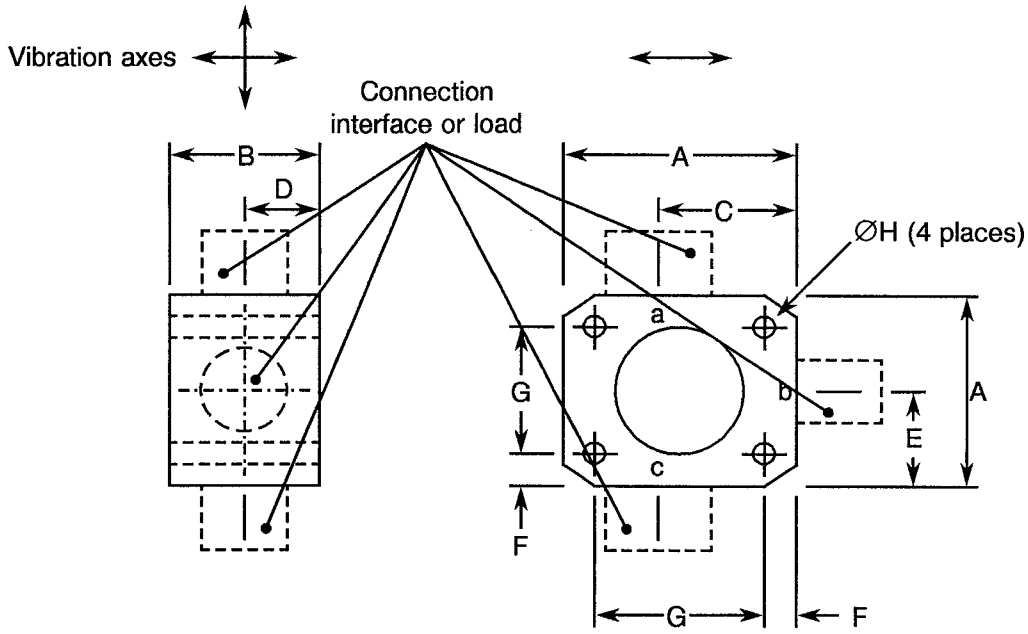


NOTES

1. Ports shall be marked as specified in Figure 3.
2. Full dimensions of the Female SMA interface are specified in ESA/SCC Detail Specification No. 3402/002.
3. Full dimensions of the Male SMA interface are specified in ESA/SCC Detail Specification No. 3402/001.

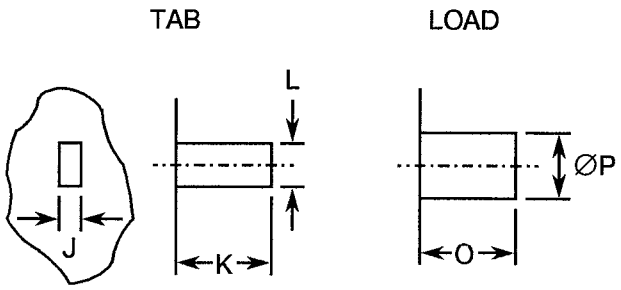
FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(h) - 1" DROP-IN



SYMBOL	MILLIMETRES	
	MIN.	MAX.
A	-	19.30
B	-	7.87
C	12.57	13.08
D	3.56	4.06
E	9.40	9.65
F	2.03	2.54
G	14.22	14.73
ØH	1.88	2.18
J	0.10	0.15
K	1.27	2.29
L	0.51	0.76
O	-	5.85
P	-	5.08

Connection interface or load as follows:

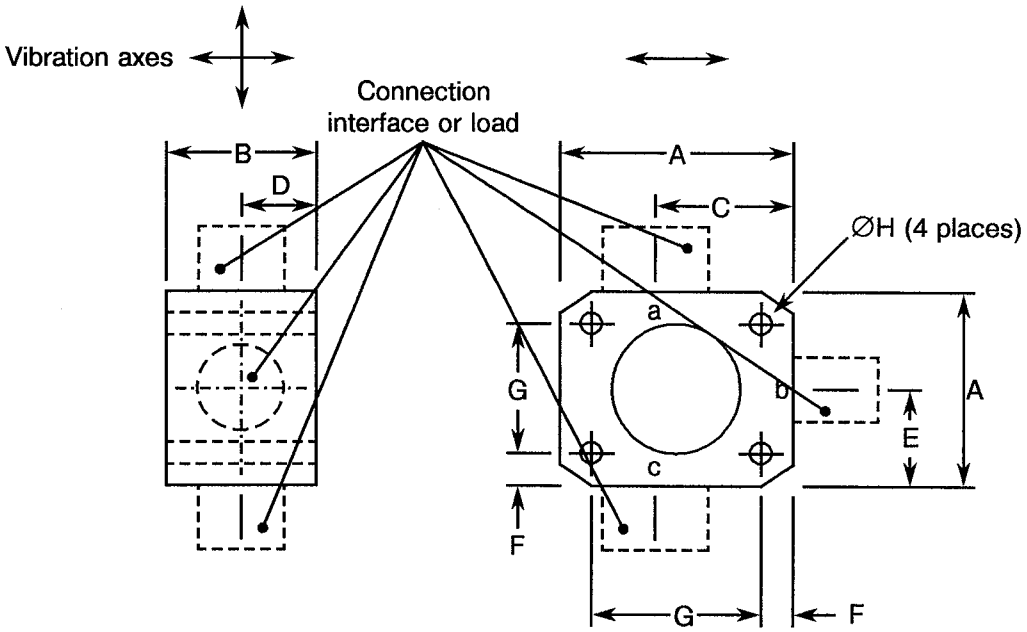


NOTES

1. Ports shall be marked as specified in Figure 3.

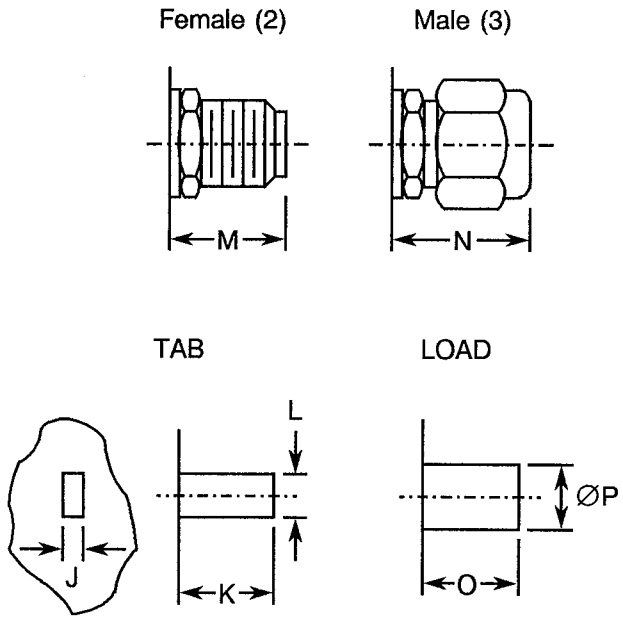
FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(i) - 1" CONNECTORISED/DROP-IN



SYMBOL	MILLIMETRES	
	MIN.	MAX.
A	-	19.30
B	-	12.95
C	12.57	13.08
D	6.10	6.60
E	9.40	9.65
F	2.03	2.54
G	14.22	14.73
ØH	1.88	2.18
J	0.10	0.15
K	1.27	2.29
L	0.51	0.76
M	-	9.02
N	-	11.30
O	-	8.89
ØP	-	6.60

Connection interface or load as follows:
SMA

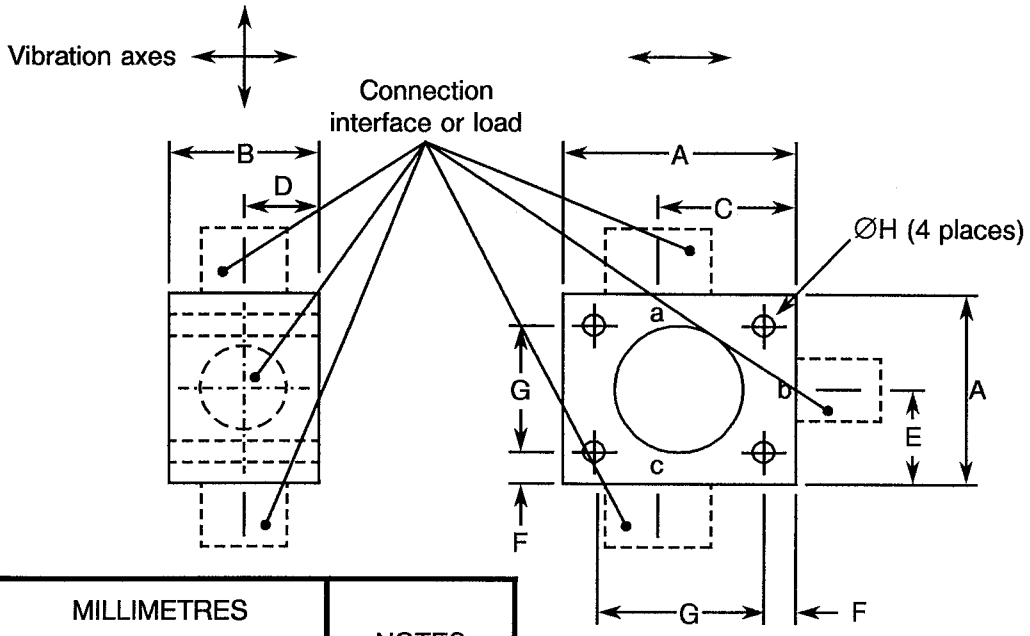


NOTES

1. Ports shall be marked as specified in Figure 3.
2. Full dimensions of the Female SMA interface are specified in ESA/SCC Detail Specification No. 3402/002.
3. Full dimensions of the Male SMA interface are specified in ESA/SCC Detail Specification No. 3402/001.

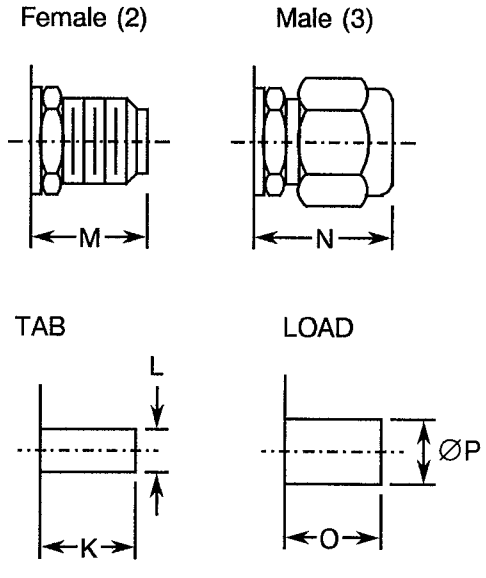
FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(j) - 1 1/2" CONNECTORISED/DROP-IN



SYMBOL	MILLIMETRES		NOTES
	MIN.	MAX.	
A	-	38.35	
B	-	12.95	
C	27.43	27.94	
D	6.10	6.60	
E	18.80	19.30	
F	3.05	3.56	
G	31.24	31.75	
ØH	3.76	4.16	
J	0.10	0.15	
K	1.27	2.29	
L	0.51	0.76	
M	-	9.02	
N	-	11.30	
O	-	5.85	4
	-	8.89	5
ØP	-	5.08	4
	-	6.60	5

Connection interface or load as follows:
SMA



NOTES

1. Ports shall be marked as specified in Figure 3.
2. Full dimensions of the Female SMA interface are specified in ESA/SCC Detail Specification No. 3402/002.
3. Full dimensions of the Male SMA interface are specified in ESA/SCC Detail Specification No. 3402/001.
4. Devices with two tabs.
5. Devices with one, or more, connectors.

FIGURE 3 - FUNCTIONAL DIAGRAM

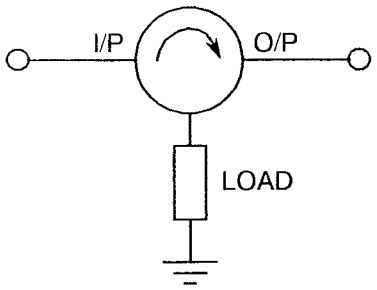


FIGURE	PORT		
	a	b	c
3(a)	I/P	O/P	LOAD
3(b)	O/P	I/P	LOAD
3(c)	LOAD	O/P	I/P
3(d)	LOAD	I/P	O/P
3(e)	O/P	LOAD	I/P
3(f)	I/P	LOAD	O/P

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 Detail Specification only, are listed in Para. 4.2.

Deviations from the applicable Generic Specifications 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. 9.6, Seal Test: Shall not be performed.

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

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. 9.6, Seal Test: Shall not be performed.

4.2.5 Deviations from Lot Acceptance Tests (Chart V)

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

4.3 MECHANICAL REQUIREMENTS

4.3.1 Contact Engagement and Separation Forces

Where applicable, the test conditions shall be as specified in ESA/SCC Detail Specification Nos. 3402/001 or 3402/002.

4.3.2 Voltage Proof

Where applicable, the test conditions shall be as specified in ESA/SCC Detail Specification Nos. 3402/001 or 3402/002.

4.3.3 Weight

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

FIGURE	No. OF TABS	No. OF SMA CONNECTORS	MAXIMUM WEIGHT (g)
2(a) to 2(c)	2	0	6
2(d)	1	1	16
2(d)	0	2	21
2(e) to 2(f)	2	0	15
2(g)	1	1	27
2(g)	0	2	32
2(h)	2	0	26
2(i)	1	1	46
2(i)	0	2	51
2(j)	2	0	113
2(j)	1	1	123
2(j)	0	2	128

4.3.4 Coupling Proof Torque

Where applicable, the applied torque shall be as specified in ESA/SCC Detail Specification Nos. 3402/001 or 3402/002.

4.3.5 Mating and Unmating Forces

Where applicable, the maximum torque shall be as specified in ESA/SCC Detail Specification Nos. 3402/001 or 3402/002.

4.3.6 Centre Contact Retention

Where applicable, the test conditions shall be as specified in ESA/SCC Detail Specification Nos. 3402/001 or 3402/002.

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

Where applicable, the test conditions shall be as specified in ESA/SCC Detail Specification Nos. 3402/001 or 3402/002.

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

Where applicable, as per ESA/SCC Detail Specification Nos. 3402/001 or 3402/002.

4.4.4 Tab

Where applicable, the tab material shall be either Type 'M' with Type '4' finish or Type 'M' with Type '7' finish in accordance with the requirements of ESA/SCC Basic Specification No. 23500. The particular material and finish shall be as specified in Table 1(a).

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) Port Identification.

(b) The SCC Component Number.

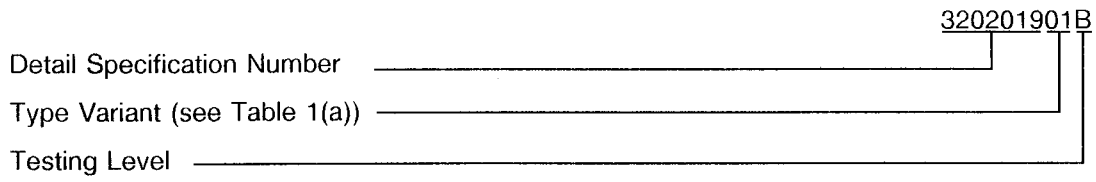
(c) Traceability Information.

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 9 of Table 1(a).

4.6.3 Circuits for Electrical Measurements

Circuits for use in performing electrical measurements 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		UNIT
				MIN.	MAX.	
1	Isolation	ISO	Para. 9.7.1.2	Table 1(a) Column 5		dB
2	Insertion Loss	IL	Para. 9.7.1.3	Table 1(a) Column 6		dB
3	Return Loss Input Output	RL_{IN} RL_{OUT}	Para. 9.7.1.4	Table 1(a) Column 7		dB
4	Insulation Resistance (Note 1)	R_i	Para. 9.7.1.5	5.0	-	MΩ

NOTES

1. Not applicable to devices with resistive loads.

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.

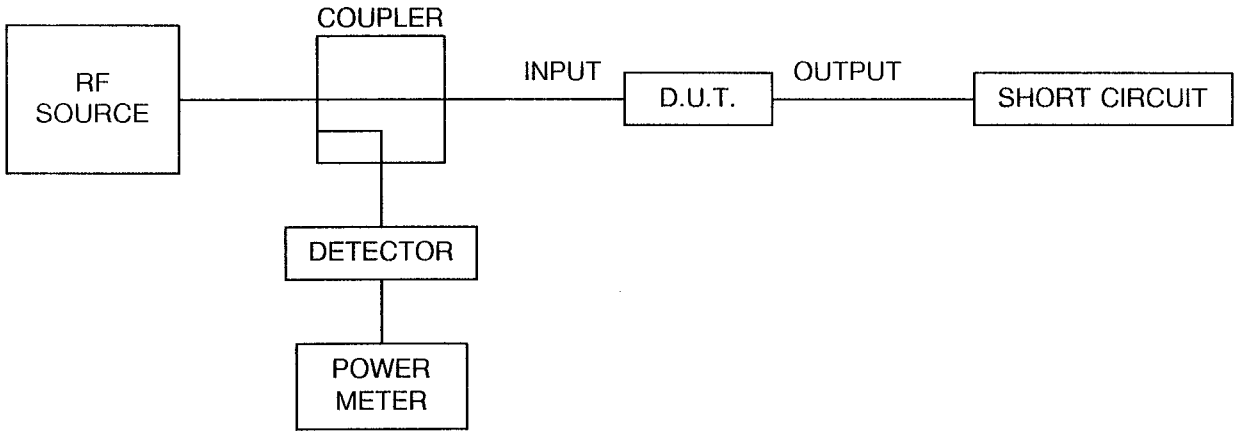
TABLE 4 - PARAMETER DRIFT VALUES

Not applicable.

TABLE 5 - CONDITIONS FOR OPERATING LIFE TEST

No.	CHARACTERISTICS	SYMBOL	CONDITION	UNIT	REMARKS
1	Centre Frequency	f_c	Table 1(a) Column 3	GHz	
2	Input Power	P	0.5 1.0 1.5	W W W	Fig 2(a) to 2(g) Fig 2(h) to (i) Fig 2(j)
3	Ambient Temperature	T_{amb}	Higher Temperature of Table 1(a) Column 9	°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.

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

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	Interface Dimensions Visual Examination	- -		3402/001 or 002, Figure 2 -	
08	Endurance	Para. 9.20	Mating/Unmating Forces Contact Resistance Visual Examination	3402, Para. 9.18 - -	 R_c 	3402/001 or 002, Table 6 3402/001 or 002, Table 6 -	 mΩ
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	3402/001 or 002, Table 6	-		3402/001 or 002, Table 6	
15	Contact Engagement and Separation Forces	Para. 9.13	3402/001 or 002, Table 6	-		3402/001 or 002, Table 6	

NOTES

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