



**european space agency  
agence spatiale européenne**

Pages 1 to 24

**RELAYS ELECTROMAGNETIC,  
RF COAXIAL SWITCH, LATCHING,  
SINGLE POLE DOUBLE THROW,  
SMA CONNECTORS, BREAK BEFORE MAKE (B.B.M),  
WITH INDICATOR CIRCUIT**

**ESA/SCC Detail Specification No. 3603/002**




**space components  
coordination group**

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Rev. Letter	Rev. Date	Reference	CHANGE Item	Approved DCR No.

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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 Relays Electromagnetic, RF Coaxial Switch, Latching, Single Pole Double Throw, SMA Connectors, Break before Make, with Indicator Circuit. It shall be read in conjunction with ESA/SCC Generic Specification No. 3603, the requirements of which are supplemented herein.

### 1.2 COMPONENT TYPE VARIANTS

Variants of the basic type relays 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 relays 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 relays specified herein are shown in Figure 2.

### 1.6 FUNCTIONAL DIAGRAM

The functional diagram for the relays specified herein, is shown in Figure 3.

### 1.7 CIRCUIT SCHEMATIC

The circuit schematic, showing terminal identification etc. for the relays specified herein, is shown in Figure 4.

## 2. APPLICABLE DOCUMENTS

The following documents form part of this specification and shall be read in conjunction with it:-

- ESA/SCC Generic Specification No. 3603 for Relays Electromagnetic, RF Coaxial Switch, Latching.
- ESA/SCC Detail Specification No. 3401/001, Connectors, Electrical, Rectangular, Non-Removable Solder Bucket, PCB and Wire-Wrap Contacts and Removable Coaxial and Power Contacts, Based on Type D\*M.
- ESA/SCC Detail Specification No. 3401/029, Connectors, Electrical, Rectangular, Microminiature, Based on Type MDM.
- ESA/SCC Detail Specification No. 3402/002 for RF Coaxial Connectors, Type SMA, 50Ω, (Female Contact).
- ESA/SCC Detail Specification No. 5103/021, Diode, Silicon, Power Rectifier, Fast Recovery, Based on Types 1N5615/17/19/21/23.
- MIL-STD-202, Test Methods for Electronic and Electrical Component Parts.

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

VARIANT No.	DESCRIPTION	FIGURE	WEIGHT (Max.) (g)
01	Stainless Steel RF Connectors, Terminals	2(a)	45
02	Gold Plated RF Connectors, Terminals	2(a)	45
03	Stainless Steel Low RF Leakage Connectors, Terminals	2(a)	45
04	Gold Plated Low RF Leakage Connectors, Terminals	2(a)	45
05	Variant 01 with Bracket Mount	2(b)	80
06	Variant 02 with Bracket Mount	2(b)	80
07	Variant 03 with Bracket Mount	2(b)	80
08	Variant 04 with Bracket Mount	2(b)	80
09	Variant 05 with DEM Connector (1)	2(c)	100
10	Variant 06 with DEM Connector (1)	2(c)	100
11	Variant 07 with DEM Connector (1)	2(c)	100
12	Variant 08 with DEM Connector (1)	2(c)	100
13	Large Can, 4 Diodes, Stainless Steel RF Connectors with DEM Connector (1) (2)	2(d)	100
14	High Can, 4 Diodes, Stainless Steel RF Connectors with MDM Connector (1) (2)	2(e)	120
15	Variant 13 with 2 Diodes (1) (2)	2(d)	100
16	Variant 14 with 2 Diodes (1) (2)	2(e)	120

**NOTES**

1. Connectors shall be procured in accordance with ESA/SCC Detail Specification 3401/001 or 3401/029 as applicable.
2. Diodes shall be procured in accordance with ESA/SCC Detail Specification 5103/021.

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

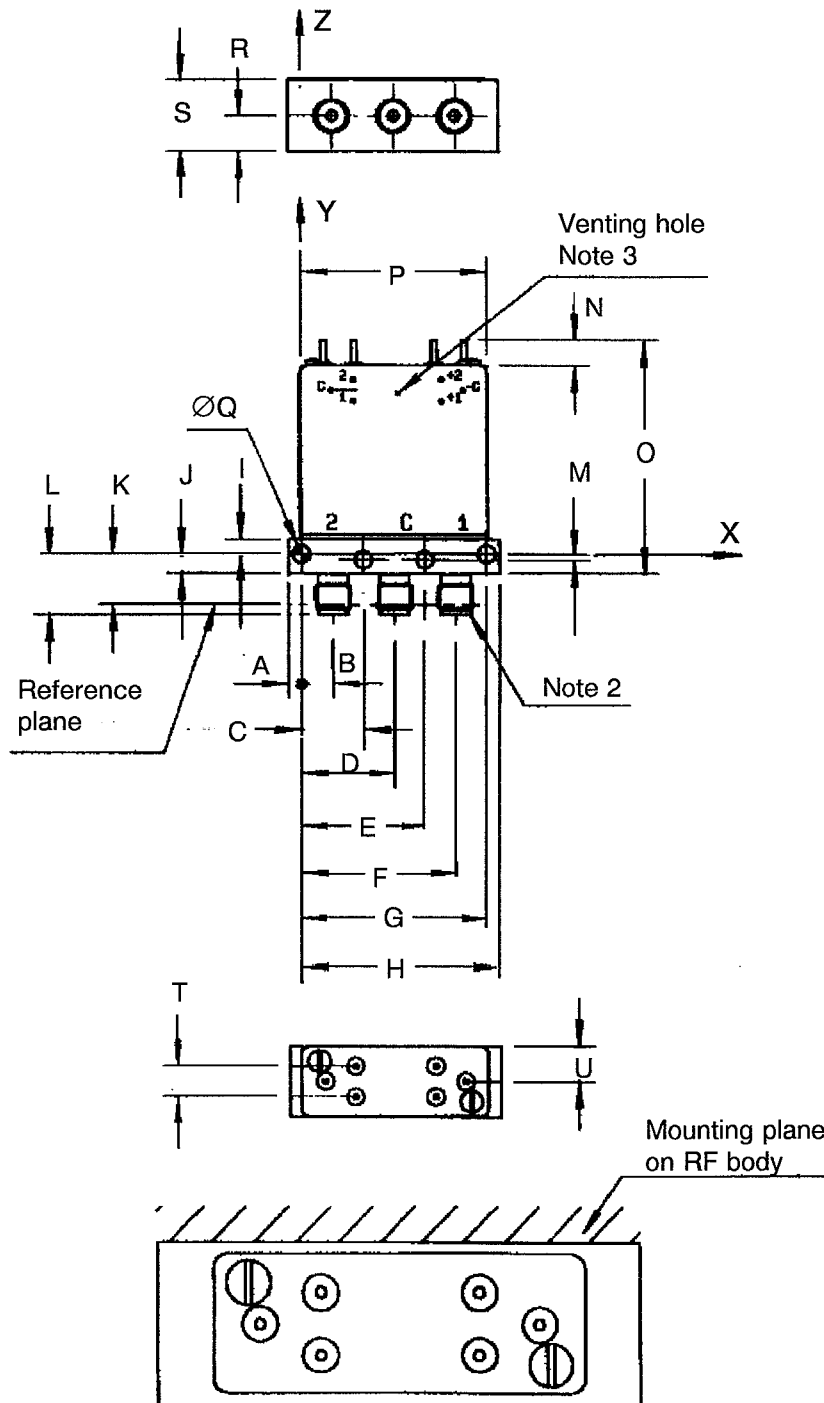
NO	CHARACTERISTICS	SYMBOL	MAXIMUM RATING	UNIT	REMARKS
1	Rated Coil Voltage (Actuation Voltage) 28V 12V	$V_C$	28 12	Vdc	
2	Maximum Coil Voltage 28V 12V	$V_{Cmax}$	32 13.2	Vdc	
3	Minimum Coil Voltage 28V 12V	$V_{Cmin}$	24 10	Vdc	
4	Coil Current 28V  12V	$I_C$	70 95 130 195	mA	At 28Vdc and $T_{amb} = +23^{\circ}C$ At 28Vdc and $T_{amb} = -40^{\circ}C$ At 12Vdc and $T_{amb} = +23^{\circ}C$ At 12Vdc and $T_{amb} = -40^{\circ}C$
5	Frequency Range	f	DC to 18	GHz	
6	RF Power	$P_{RF}$	1.0	W (CW)	
7	Indicator Circuit Voltage Current	$V_{ind}$ $I_{ind}$	30 100	V mA	d.c. max or a.c. rms
8	RF Leakage	E	- 40	dB	
9	Operating Temperature Range	$T_{op}$	- 35 to + 75	$^{\circ}C$	$T_{amb}$
10	Storage Temperature Range	$T_{stg}$	- 40 to + 85	$^{\circ}C$	
11	Soldering Temperature	$T_{sol}$	+ 230	$^{\circ}C$	Note 1

**NOTES**

- Duration 10 seconds maximum at a distance of not less than 2.0mm from the device header and the same terminal shall not be resoldered until 3 minutes have elapsed.

**FIGURE 1 - PARAMETER DERATING INFORMATION**

Not applicable.

**FIGURE 2 - PHYSICAL DIMENSIONS**
**FIGURE 2(a) - VARIANTS 01, 02, 03 AND 04**


SYMBOL	MILLIMETRES		REMARKS
	MIN	MAX	
A	1.8	2.8	
B	5.1	6.1	
C	10.6	11.6	
D	16.2	17.2	Note 1
E	21.8	22.8	Note 1
F	27.4	28.4	Note 1
G	33.0	34.0	
H	35.3	36.3	Note 1
I	2.1	3.1	
J	2.9	3.9	Note 1
K	8.4	9.4	Note 1
L	10.3	11.3	Note 1
M	0.5	1.5	Note 1
N	-	5.1	Note 1
O	-	50.1	Note 1
P	33.2	34.2	
ØQ	2.6	3.6	Note 1
R	5.9	6.9	
S	12.3	13.3	
T	5.1	6.1	
U	5.9	6.9	Note 1

**NOTES**

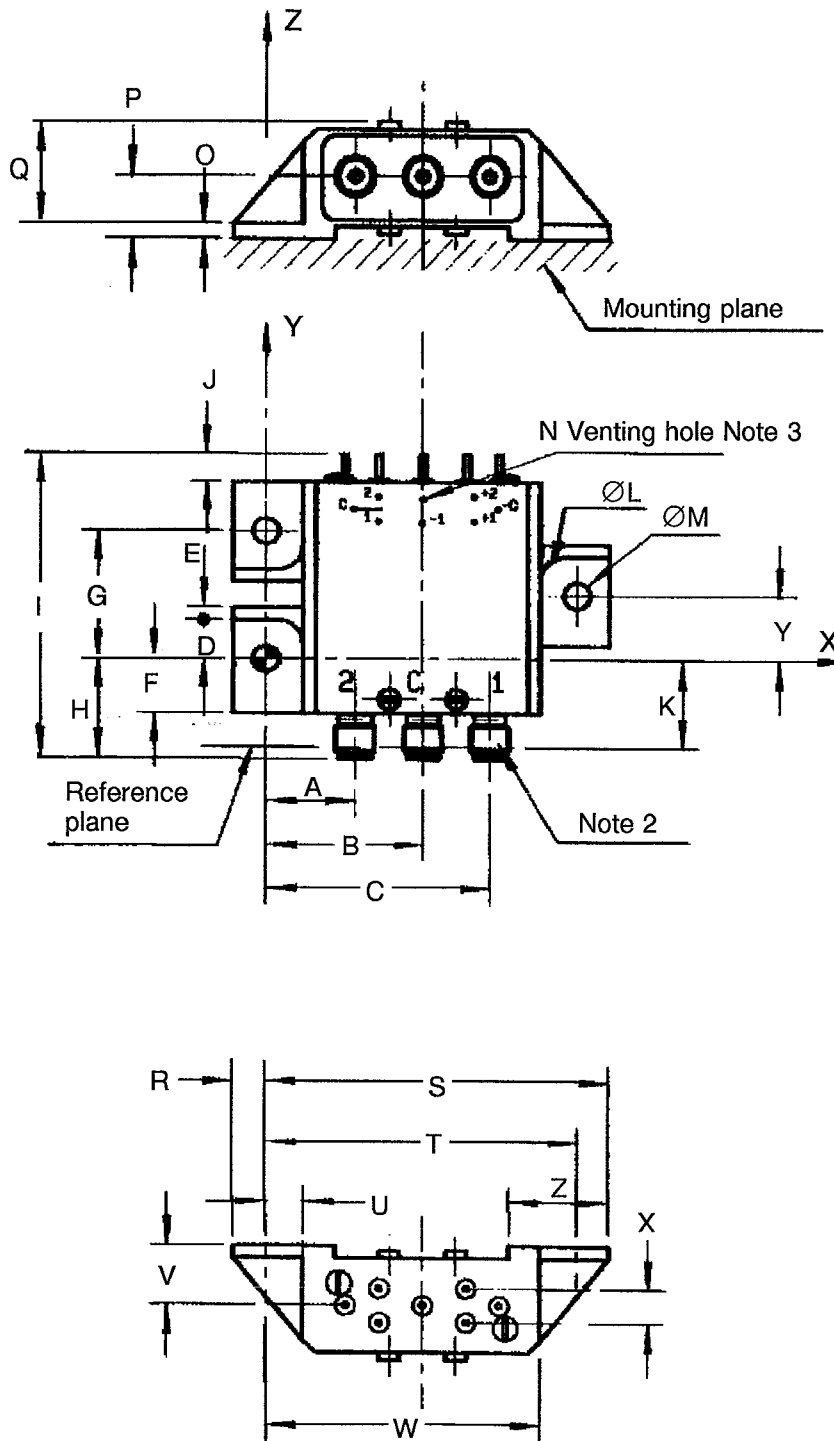
1. Guaranteed but not measured.
2. 3 SMA female connectors according to ESA/SCC 3402.
3. This hole shall be closed by a small piece of space approved adhesive tape up to integration of the component into the satellite.





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

FIGURE 2(b) - VARIANTS 05, 06, 07 AND 08



SYMBOL	MILLIMETRES		REMARKS
	MIN	MAX	
A	13.4	14.4	
B	24.6	25.6	
C	35.8	36.8	
D	6.0	7.9	Note 1
E	1.5	2.5	Note 1
F	8.5	9.5	Note 1
G	20.4	20.9	
H	15.9	16.9	Note 1
I	-	50.0	
J	-	4.5	Note 1
K	14.0	15.0	Note 1
ØL	4.5	5.5	Note 1
ØM	4.4	4.6	Note 1
N	0.5	0.7	Note 1
O	2.0	3.0	Note 1
P	9.5	10.5	
Q	-	20.0	
R	4.7	5.7	
S	54.8	55.8	
T	50.1	50.4	
U	5.5	6.5	Note 1
V	9.5	10.5	Note 1
X	43.7	53.7	Note 1
Y	5.1	6.1	Note 1

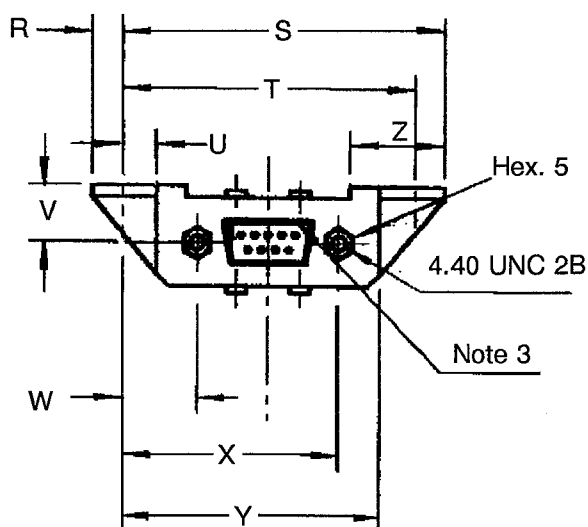
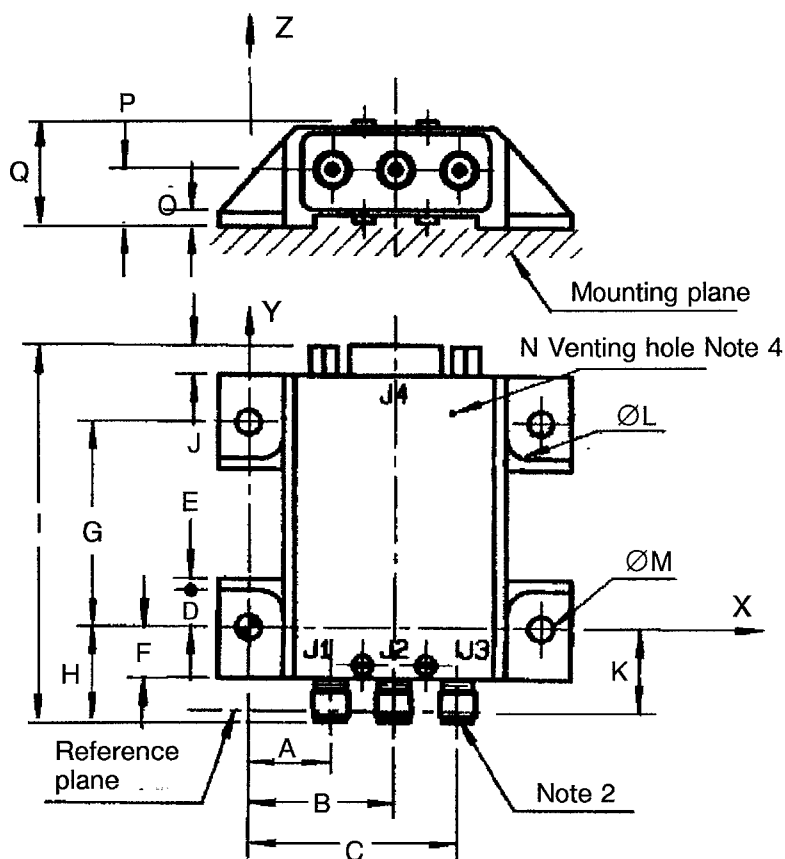
**NOTES**

1. Guaranteed but not measured.
2. 3 SMA female connectors according to ESA/SCC 3402.
3. This hole shall be closed by a small piece of space approved adhesive tape up to integration of the component into the satellite.



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

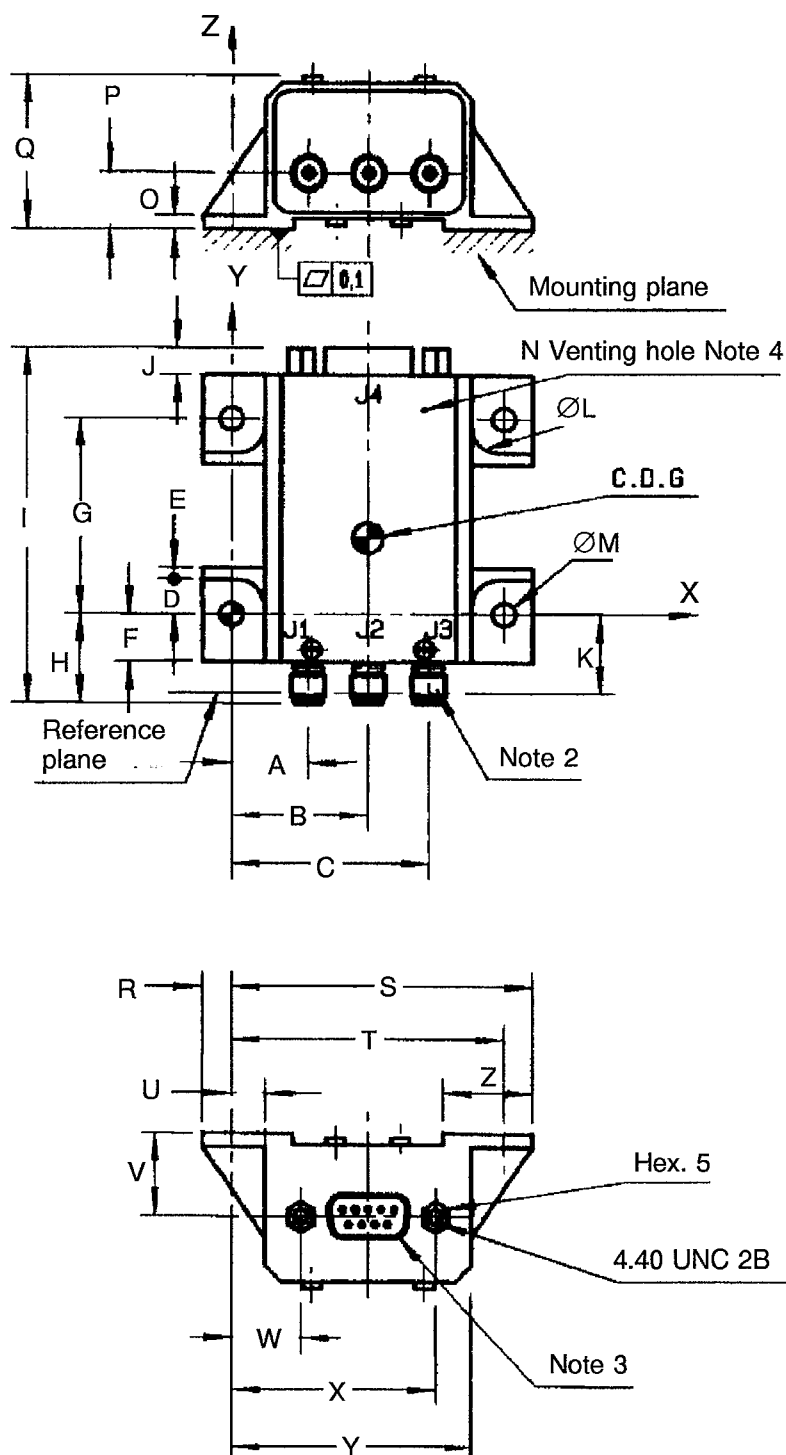
FIGURE 2(c) - VARIANTS 09, 10, 11 AND 12



SYMBOL	MILLIMETRES		REMARKS
	MIN	MAX	
A	13.4	14.4	
B	24.6	25.6	
C	35.8	36.8	
D	6.0	7.0	Note 1
E	1.5	2.5	Note 1
F	8.5	9.5	Note 1
G	35.4	35.7	
H	15.9	16.9	Note 1
I	-	65.0	
J	-	5.0	Note 1
K	14.0	15.0	Note 1
ØL	4.5	5.5	Note 1
ØM	4.4	4.6	Note 1
N	0.5	0.7	Note 1
O	2.0	3.0	Note 1
P	9.5	10.5	
Q	-	20.0	
R	4.7	5.7	
S	54.8	55.8	
T	50.1	50.4	
U	5.5	6.5	Note 1
V	9.5	10.5	Note 1
W	12.1	13.1	Note 1
X	37.1	38.1	Note 1
Y	43.7	44.7	Note 1
Z	15.9	16.9	Note 1

**NOTES**

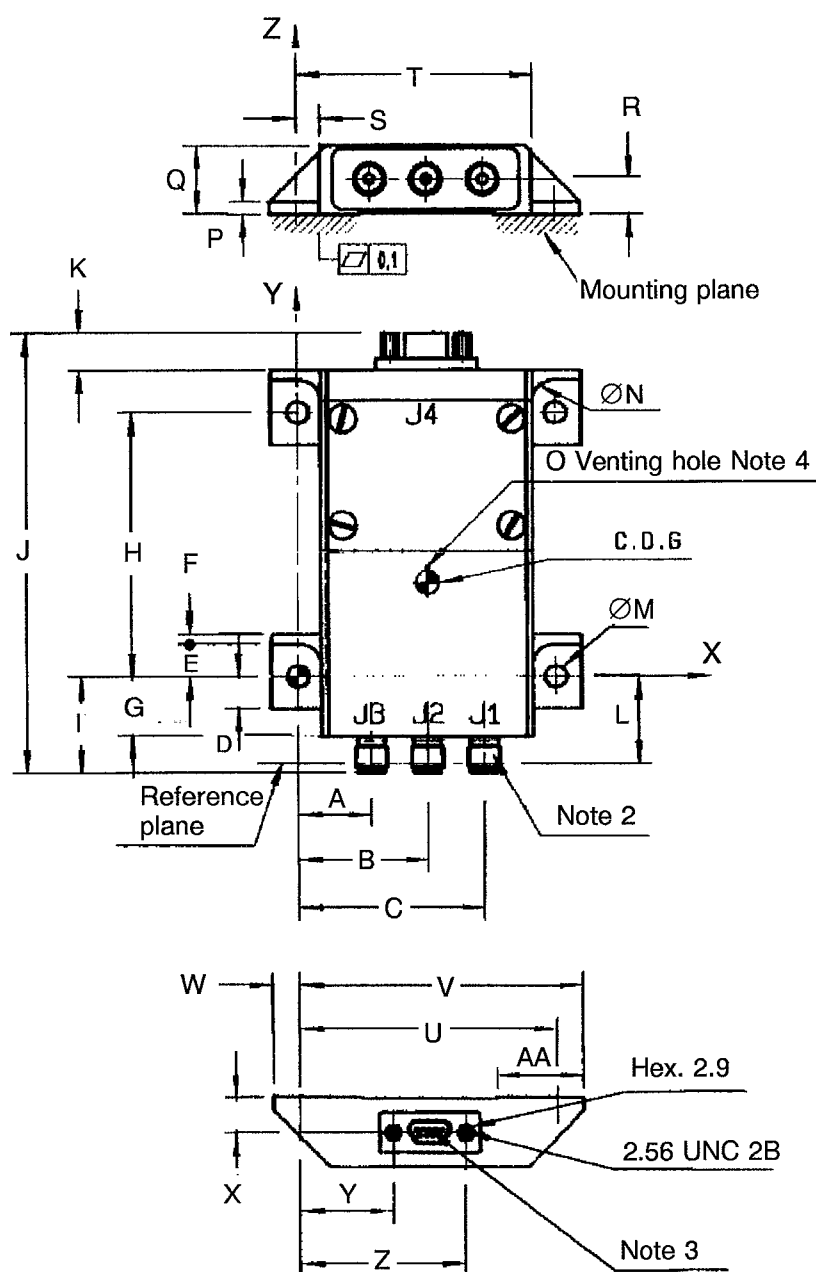
1. Guaranteed but not measured.
2. 3 SMA female connectors according to ESA/SCC 3402.
3. DEM connector (ESA/SCC 3401/001).
4. This hole shall be closed by a small piece of space approved adhesive tape up to integration of the component into the satellite.

**FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)**
**FIGURE 2(d) - VARIANTS 13 AND 15**


SYMBOL	MILLIMETRES		REMARKS
	MIN	MAX	
A	13.4	14.4	
B	24.6	25.6	
C	35.8	36.8	
D	6.0	7.0	Note 1
E	1.5	2.5	Note 1
F	8.5	9.5	Note 1
G	35.4	35.7	
H	15.9	16.9	Note 1
I	-	65.0	
J	-	5.0	Note 1
K	14.0	15.0	Note 1
ØL	4.5	5.5	Note 1
ØM	4.4	4.6	Note 1
N	0.5	0.7	Note 1
O	2.0	3.0	Note 1
P	9.5	10.5	
Q	-	28.2	
R	4.7	5.7	
S	54.8	55.8	
T	50.1	50.4	
U	5.5	6.5	Note 1
V	14.8	15.8	Note 1
W	12.1	13.1	Note 1
X	37.1	38.1	Note 1
Y	43.7	44.7	Note 1
Z	15.9	16.9	Note 1

**NOTES**

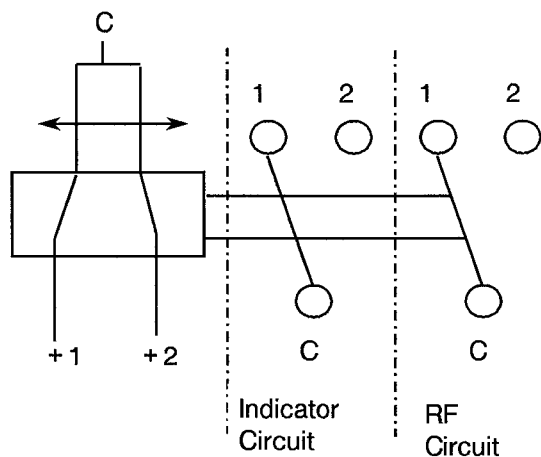
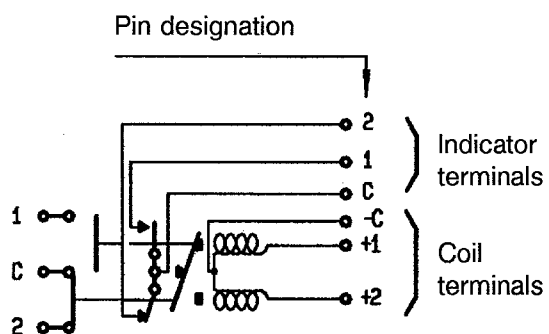
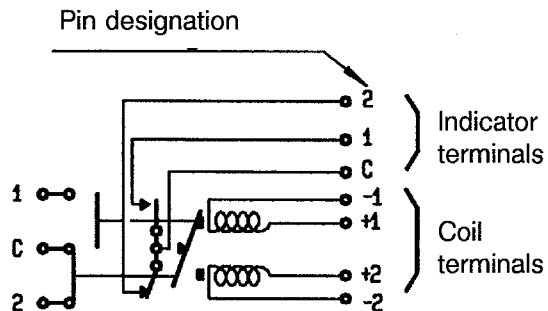
1. Guaranteed but not measured.
2. 3 SMA female connectors according to ESA/SCC 3402.
3. DEM connector (ESA/SCC 3401/001).
4. This hole shall be closed by a small piece of space approved adhesive tape up to integration of the component into the satellite.

**FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)**
**FIGURE 2(e) - VARIANTS 14 AND 16**


SYMBOL	MILLIMETRES		REMARKS
	MIN	MAX	
A	13.8	14.8	
B	25.0	26.0	
C	36.2	37.2	
D	5.8	6.8	Note 1
E	5.8	6.8	Note 1
F	1.5	2.5	Note 1
G	18.6	19.6	Note 1
H	44.5	44.8	Note 1
I	26.0	27.0	Note 1
J	-	88.5	Note 1
K	-	8.0	
ØL	24.1	25.1	Note 1
ØM	3.3	3.5	Note 1
N	3.5	4.5	Note 1
O	0.5	0.7	Note 1
P	1.2	2.2	Note 1
Q	-	13.5	Note 1
R	6.4	7.4	
S	4.0	5.0	
T	46.0	47.0	Note 1
U	50.9	51.2	Note 1
V	55.7	56.7	
W	4.7	5.7	
X	6.4	7.4	
Y	17.8	18.8	Note 1
Z	32.2	32.2	Note 1
AA	17.0	18.0	Note 1

**NOTES**

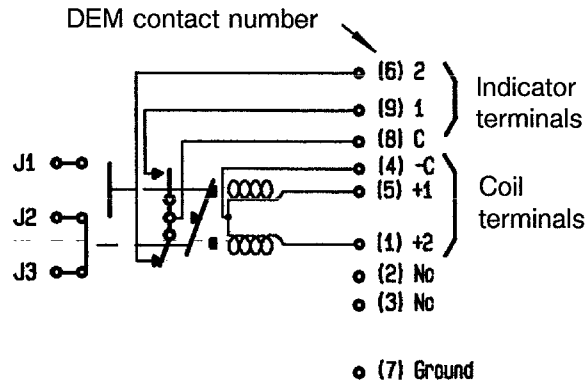
1. Guaranteed but not measured.
2. 3 SMA female connectors according to ESA/SCC 3402.
3. MDM connector (ESA/SCC 3401/029).
4. This hole shall be closed by a small piece of space approved adhesive tape up to integration of the component into the satellite.

**FIGURE 3 - FUNCTIONAL DIAGRAM**

**FIGURE 4 - CIRCUIT SCHEMATIC**
VARIANTS 01 TO 04

VARIANTS 05 TO 08


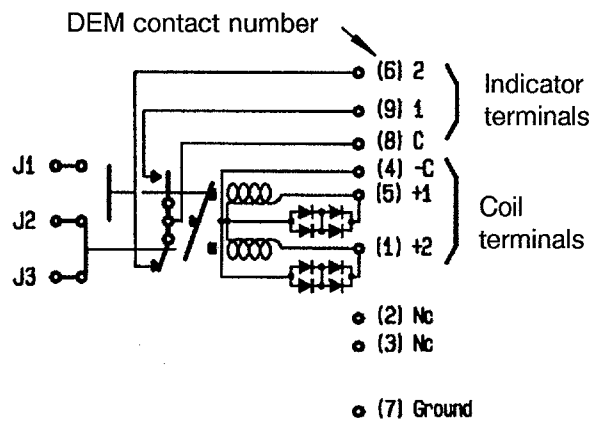


**FIGURE 4 - CIRCUIT SCHEMATIC (CONTINUED)**

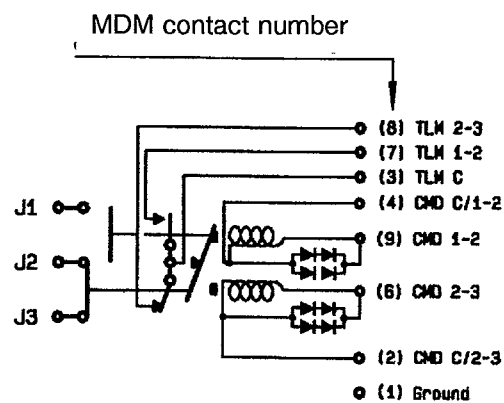
VARIANTS 09, 10, 11 AND 12



VARIANT 13



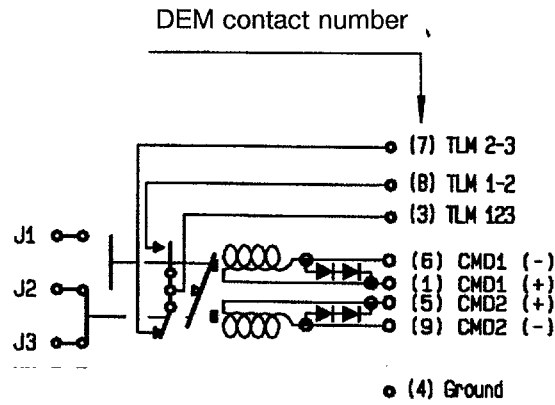
VARIANT 14



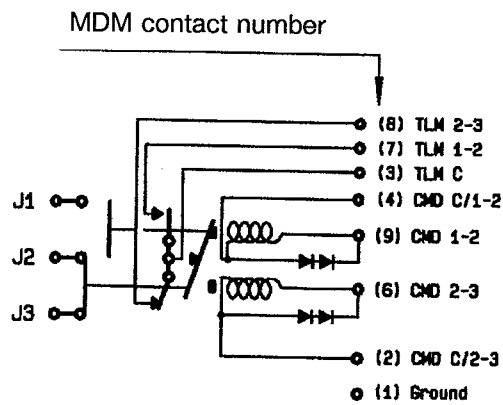


**FIGURE 4 - CIRCUIT SCHEMATIC (CONTINUED)**

VARIANT 15



VARIANT 16



**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:-

CW	=	Continuous Wave.
E	=	RF Leakage.
I <sub>C</sub>	=	Coil Current.
I <sub>ind</sub>	=	Indicator Circuit Current.
IL	=	Insertion Loss.
ISO	=	Isolation.
P <sub>RF</sub>	=	RF Power.
R <sub>C</sub>	=	Coil Resistance.
R <sub>Cind</sub>	=	Contact Resistance Indicator Circuit.
R <sub>CRF</sub>	=	Contact Resistance RF Path.
t <sub>b</sub>	=	Bounce Time.
t <sub>op</sub>	=	Operate Time.
U <sub>p</sub>	=	Pick-up Voltage.
V <sub>C</sub>	=	Coil Voltage.
V <sub>ind</sub>	=	Indicator Circuit Voltage.
VSWR	=	Voltage Standing Wave Ratio.

**4. REQUIREMENTS****4.1 GENERAL**

The complete requirements for procurement of the relays specified herein shall be as stated in this specification and ESA/SCC Generic Specification No. 3603 for Relays Electromagnetic, RF Coaxial Switch, Latching. 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 effect 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 Screening and Electrical Measurements (Chart III)**

None.

**4.2.4 Deviations from Qualification Tests (Chart IV)**

None.

**4.2.5 Deviations from Lot Acceptance Tests (Chart V)**

None.





#### 4.3 MECHANICAL REQUIREMENTS

##### 4.3.1 Dimension Check

The dimensions of the relays specified herein shall be verified in accordance with the requirements set out in Para 9.3 of ESA/SCC Generic Specification No. 3603 and shall conform to those shown in Figure 2.

##### 4.3.2 Weight

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

##### 4.3.3 Robustness of Terminations (Variants 01 to 08 only for Indicator and Coil Terminals)

The requirements for robustness of terminations testing are specified in Section 9 of ESA/SCC Generic Specification No. 3603. The test conditions shall be as follows:-

(a) **Pull Force** : 45N.

(b) **Duration** : 5 seconds.

##### 4.3.4 Coupling Proof Torque (SMA Connectors)

In accordance with ESA/SCC Detail Specification No. 3402/002, Para. 4.3.3.

##### 4.3.5 Mating and Unmating Forces (SMA Connectors and Variants 09 to 16 d.c. Connectors)

In accordance with ESA/SCC Detail Specification No. 3402/002, Para. 4.3.5 for SMA connectors and Detail Specification No. 3401/001 or 3401/029 for Variants 09 to 16.

##### 4.3.6 Contact Separation Force (SMA Connectors)

In accordance with ESA/SCC Detail Specification No. 3402/002, Para. 4.3.8(c).

#### 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 relays 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

Aluminium, black anodised for Variants 01 to 04.

Aluminium, chromated for Variants 05 to 16.

##### 4.4.2 RF Body

Aluminium, electroless nickel plated.

##### 4.4.3 RF Connectors

Connectors shall be in accordance with ESA/SCC Detail Specification No. 3402/002. Materials to be:

- Body

Variants 01, 03, 05, 07, 09, 11 and 13 to 16: Passivated stainless steel.

Variants 02, 04, 06, 08, 10 and 12: BeCu gold plated.

- Centre Contact: BeCu gold plated.

4.4.4 Terminals

For Variants 01 to 08, the terminal material shall be Type 'D', with Type '9' finish in accordance with the requirements of ESA/SCC Basic Specification No. 23500. For Variants 09 to 16, see Figure 2 for connector terminals.

4.5 MARKING

4.5.1 General

The marking of all components delivered to this specification shall be in accordance with 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:-

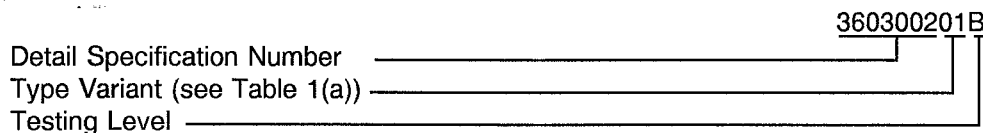
- (a) Terminal Identification.
- (b) The SCC Component Number.
- (c) Electrical Characteristics.
- (d) Traceability Information.

4.5.2 Terminal Identification

Terminal identification shall be marked on the switch case in accordance with Figure 4.

4.5.3 The SCC Component Number

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



4.5.4 Electrical Characteristics

The electrical characteristic to be marked is the maximum coil voltage. The information shall be constituted and marked as follows.

Coil Voltage	Code
28Vdc	28V
12Vdc	12V



4.5.5 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 stated, the measurements shall be performed at  $T_{amb} = +22 \pm 3 \text{ }^\circ\text{C}$ .

		<p style="text-align: center;">ESA/SCC Detail Specification No. 3603/002</p>	<p>PAGE 19 ISSUE 1</p>
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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. Unless otherwise stated, the measurements shall be performed at  $T_{amb} = +75(+0-3)$  and  $-35(+3-0)$  °C respectively.

4.6.3 Circuits for Electrical Measurements (Figure 4)

Not applicable.

4.7 SCREENING

4.7.1 Parameter Drift Values

The parameter drift values applicable to screening are as specified in Table 4 of this specification. Measurements shall be performed at  $T_{amb} = +22 \pm 3$  °C. The parameter drift values ( $\Delta$ ) applicable to the parameters scheduled shall not be exceeded. In addition to these drift value requirements for a given parameter, the appropriate limit values specified in Table 2 shall not be exceeded.

4.7.2 Conditions for Screening

The requirements for screening are specified in Section 7 of ESA/SCC Generic Specification No. 3603. The conditions for screening shall be as specified in Para. 9.6 of ESA/SCC Generic Specification No. 3603.

4.7.3 Electrical Circuits for Screening (Figure 5)

Not applicable.

**TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE - D.C. PARAMETERS**

NO	CHARACTERISTICS	SYMBOL	ESA/SCC 3603 TEST METHOD	TEST CONDITION	LIMITS		UNIT
					MIN.	MAX.	
1	Pick-up Voltage 28V 12V	U <sub>P</sub>	Para. 9.4.1.1	Para. 9.4.1.1	10 4.0	18 8.0	V
2	Operate Time	t <sub>op</sub>	Para. 9.4.1.2	Para. 9.4.1.2	-	10	ms
3	Bounce Time	t <sub>b</sub>	Para. 9.4.1.2	Para. 9.4.1.2	-	4.0	ms
4	Insulation Resistance	R <sub>i</sub>	Para. 9.4.1.3	Para. 9.4.1.3	10 000	-	MΩ
5	Voltage Proof	VP	Para. 9.4.1.4	Para. 9.4.1.4 500Vrms	-	1.0	mA
6	Contact Resistance RF Path Indicator Circuit	R <sub>CRF</sub> R <sub>Cind</sub>	Para. 9.4.1.5	Para. 9.4.1.5  Variants 01 to 08 Variants 09 to 16	- - -	0.02 0.05 0.10	Ω
7	Coil Resistance 28V 12V	R <sub>C</sub>	Para. 9.4.1.6	Para. 9.4.1.6	405 85	495 95	Ω

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

NO	CHARACTERISTICS	SYMBOL	ESA/SCC 3603 TEST METHOD	TEST CONDITION	LIMITS		UNIT
					MIN.	MAX.	
8	Insertion Loss	IL	Para. 9.4.1.7	f = Table 1(b) Item 5	-	0.1 + (0.0167 x f) (f in GHz)	dB
9	Isolation	ISO	Para. 9.4.1.8	f = Table 1(b) Item 5	80 - (1.1 x f) (f in GHz)	-	dB
10	Voltage Standing Wave Ratio	VSWR	Para. 9.4.1.9	f = Table 1(b) Item 5	-	1.05 + (0.0167 x f) (f in GHz)	

**TABLE 3 - ELECTRICAL MEASUREMENTS AT HIGH AND LOW TEMPERATURES**

NO	CHARACTERISTICS	SYMBOL	ESA/SCC 3603 TEST METHOD	TEST CONDITION	LIMITS		UNIT
					MIN	MAX	
1	Pick-up Voltage 28V 12V	$U_p$	Para. 9.4.1.1	Para. 9.4.1.1	8.0 (2) 3.0 (2)	20 (3) 10 (3)	V
4	Insulation Resistance	$R_i$	Para. 9.4.1.3	Para. 9.4.1.3 (Note 1)	100	-	$M\Omega$
6	Contact Resistance RF Path Indicator Circuit	$R_{CRF}$ $R_{Cind}$	Para. 9.4.1.5	Para. 9.4.1.5  All Variants (Note 3)	-	100	$m\Omega$
7	Coil Resistance 28V 12V	$R_C$	Para. 9.4.1.6	Para. 9.4.1.6	305 (2) 60 (2)	608 (3) 115 (3)	$\Omega$

**NOTES**

1. This measurement shall be made only at the high temperature condition.
2. At low temperature.
3. At high temperature.

**TABLE 4 - PARAMETER DRIFT VALUES**

NO	CHARACTERISTICS	SYMBOL	SPEC. AND/OR TEST METHOD	TEST CONDITIONS	CHANGE LIMITS ( $\Delta$ )	UNIT
1	Pick-up Voltage Drift	$\frac{\Delta U_p}{U_p}$	As per Table 2	As per Table 2	$\pm 5.0$	%

**TABLE 5 - CONDITIONS FOR LIFE TESTS**


NO	CHARACTERISTICS	SYMBOL	CONDITION	UNIT
1	Ambient Temperature	$T_{amb}$	+75	$^{\circ}C$
2	Indicator Circuit Voltage Current	$V_{ind}$ $I_{ind}$	30 100	V mA
3	RF Contact Voltage Current	V I	30 (max) (1) 10 (max) (1)	mV mA

**NOTES**

1. Shall not be switched.

**FIGURE 5 - ELECTRICAL CIRCUIT FOR LIFE TESTS**

Not applicable.

	<p style="text-align: center;">ESA/SCC Detail Specification No. 3603/002</p>	<p style="text-align: right;">PAGE 22 ISSUE 1</p>
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4.8 ENVIRONMENTAL AND ENDURANCE TESTS (CHARTS IV AND V OF ESA/SCC GENERIC SPECIFICATION NO. 3603)

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

4.8.2 Measurements and Inspections during Endurance Tests

The parameters to be measured and inspections to be performed during endurance tests are scheduled in Table 6 of this specification. Unless otherwise stated, the measurements shall be performed at the applicable test temperature.

4.8.3 Measurements and Inspections on Completion of Endurance Tests

The parameters to be measured and inspections to be performed on completion of the endurance tests are scheduled in Table 6 of this specification. Unless otherwise stated, the measurements shall be performed at  $T_{amb} = +22 \pm 3 \text{ }^{\circ}\text{C}$ .

4.8.4 Conditions for Life Tests (Part of Endurance Testing)

The requirements for life testing are specified in Section 9 of ESA/SCC Generic Specification No. 3603. The conditions for life testing shall be as specified in Table 5 of this specification.

4.8.5 Electrical Circuits for Life Tests (Figure 5)

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 GEN.SPEC.NO. 3603		MEASUREMENTS AND INSPECTIONS		SYMBOL	LIMITS		UNIT
	ENVIRONMENTAL AND ENDURANCE TESTS (1)	TEST METHOD AND CONDITIONS	IDENTIFICATION	CONDITIONS		MIN.	MAX.	
01	Vibration Sinusoidal  Random	Para. 9.8 Para. 9.8.1  Para. 9.8.2	<b>Measurements during Test</b> Contact Monitoring  <b>Final Measurements</b> Visual Examination <b>Measurements during Test</b> Contact Monitoring  <b>Final Measurements</b> Visual Examination Electr. Measurements	ESA/SCC 3603 Para. 9.8.1(c)  Loosening of parts  ESA/SCC 3603 Para. 9.8.2(c)  Loosening of parts Table 2, Items 1, 2, 3	- -  - -  - -	- -  - -  - -	- -  - -  Table 2 Items 1, 2, 3	
02	Rapid Change of Temperature	Para. 9.9	<b>During last cycle</b> Electr. Measurements	Table 3	-	-	Table 3	
03	RF Leakage	Para. 9.10	R.F. Leakage	Table 1(b) Item 8	E	-	Table 1(b) Item 8	
04	Mechanical Shock	Para. 9.11	<b>Measurements during Test</b> Contact Monitoring  <b>Final Measurements</b> Visual Examination Electr. Measurements	ESA/SCC 3603 Para. 9.11(c)  Para. 9.8.1(d) Table 2	- -  -	- -  -	- -  Table 2	
05	Permanence of Marking	Para. 9.12	<b>Final Measurements</b> Visual Examination	No corrosion or obliteration of marking	-	-	-	
06	Solderability	Para. 9.13	-	-	-	-	-	
07	Resistance to Soldering Heat	Para. 9.14	<b>Final Measurements</b> Electr. Measurements	Table 2 Items 1 to 7	-	-	Table 2 Items 1 to 7	
08	Terminal Strength	Para. 9.15 & Para. 4.3.3 of this spec.	<b>Examination after test</b> Visual Examination	No dislodging of or undue play on terminals	-	-	-	
09	Coupling Proof Torque	Para. 9.16 & Para. 4.3.4 of this spec.	Connector Interface Dimension Check	ESA/SCC 3402 Para. 9.4	-	-	Para. 4.3.4	
10	Mating and Unmating Forces	Para. 9.17 & Para. 4.3.5 of this spec.	Force	Para. 4.3.5 of this spec.	F	-	Para. 4.3.5	
11	Damp Heat Steady State	Para. 9.18	Not applicable					

**NOTES**

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

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

NO	ESA/SCC GEN.SPEC.NO. 3603		MEASUREMENTS AND INSPECTIONS		SYMBOL	LIMITS		UNIT
	ENVIRONMENTAL AND ENDURANCE TESTS (1)	TEST METHOD AND CONDITIONS	IDENTIFICATION	CONDITIONS		MIN.	MAX.	
12	Life	Para. 9.19	<b>Measurements during Test</b> Contact Resistance RF Contacts Indicator Contacts <b>Final Measurements</b> Electr. Measurements RF Contacts Indicator Contacts Electr. Measurements	ESA/SCC 3603 Para. 9.19(e) Table 5 of this spec. Table 2, Items 1, 2, 3, 4, 5 Table 2 Item 6 Table 2 Item 6 Table 2, Items 7, 8, 9, 10	R <sub>CRF</sub> R <sub>Cind</sub> - R <sub>CRF</sub> R <sub>Cind</sub> -	ESA/SCC 3603 Para. 9.19(e) - 0.5 - 0.5 Table 2, Items 1, 2, 3, 4, 5 - 0.04 - 0.1 (2) Table 2, Items 7, 8, 9, 10	Ω Ω Ω Ω Ω	
13	Mechanical Life	Para. 9.20	<b>Final Measurements</b> Contact Resistance RF Contacts Indicator Contacts	Table 2, Item 6 Table 2, Item 6	R <sub>CRF</sub> R <sub>Cind</sub>	- 10 - 10	Ω	
14	Thermal Vacuum	Para. 9.21	<b>Measurements during Test (Chart IV)</b> RF Power Handling Electr. Measurements <b>Final Measurements</b> Electr. Measurements	ESA/SCC 3603 Para. 9.21(d) After each power handling Table 3 Table 2	- - -	Table 3 Table 2		
15	Seal Test (Non-vented Devices)	Para. 9.22	Not applicable					

**NOTES**

1. The tests in this table refer to either Chart IV or Chart V and shall be used as applicable.
2. 0.2 for Variants 09 to 16.