RF COAXIAL BLIND-MATE SLIDE-ON ADAPTORS AND CONNECTING PIECES

BASED ON TYPE SMP

ESCC Detail Specification No. 3402/026

Issue 2	November 2023

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DCR No.	CHANGE DESCRIPTION
1439	Specification updated to incorporate changes per DCR.

TABLE OF CONTENTS

1 GENERAL

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics, and test and inspection data for the component type variants and/or the range of components specified below. It supplements the requirements of, and shall be read in conjunction with, the ESCC Generic Specification listed under Applicable Documents.

1.2 APPLICABLE DOCUMENTS

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

(a) ESCC Generic Specification No. 3402.

(b) MIL-STD-348, Department of Defence Interface Standard: Radio Frequency Connector Interfaces.

1.3 TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESCC Basic Specification No. 21300 shall apply.

1.4 THE ESCC COMPONENT NUMBER AND COMPONENT TYPE VARIANTS

1.4.1 The ESCC Component Number

The ESCC Component Number shall be constituted as follows:

Example: 340202601

- Detail Specification Reference: 3402026
- Component Type Variant Number: 01 (as required)

1.4.2 Component Type Variants

The component type variants applicable to this specification are as follows:

Variant Number	Description (Note 1)
01	SMP In-series Adaptor, Female-to-Female, 6.45mm
02	SMP In-series Adaptor, Female-to-Female, 7mm
03	SMP In-series Adaptor, Female-to-Female, 8.2mm
04	SMP In-series Adaptor, Female-to-Female, 8.6mm
05	SMP In-series Adaptor, Female-to-Female, 9.9mm
06	SMP In-series Adaptor, Female-to-Female, 11.4mm
07	SMP In-series Adaptor, Female-to-Female, 12.59mm
08	SMP In-series Adaptor, Female-to-Female, 16.74mm
09	SMP In-series Adaptor, Female-to-Female, 19.5mm
10	SMP In-series Adaptor, Female-to-Female, 22.39mm
11	SMP In-series Adaptor, Female-to-Female, 23.8mm
12	SMP In-series Adaptor, Female-to-Female, 24.19mm
13	SMP Bulkhead Male Receptacle without Centre Contact, Limited Detent

NOTES:

1. See Para. 3 for details.

1.5 MAXIMUM RATINGS

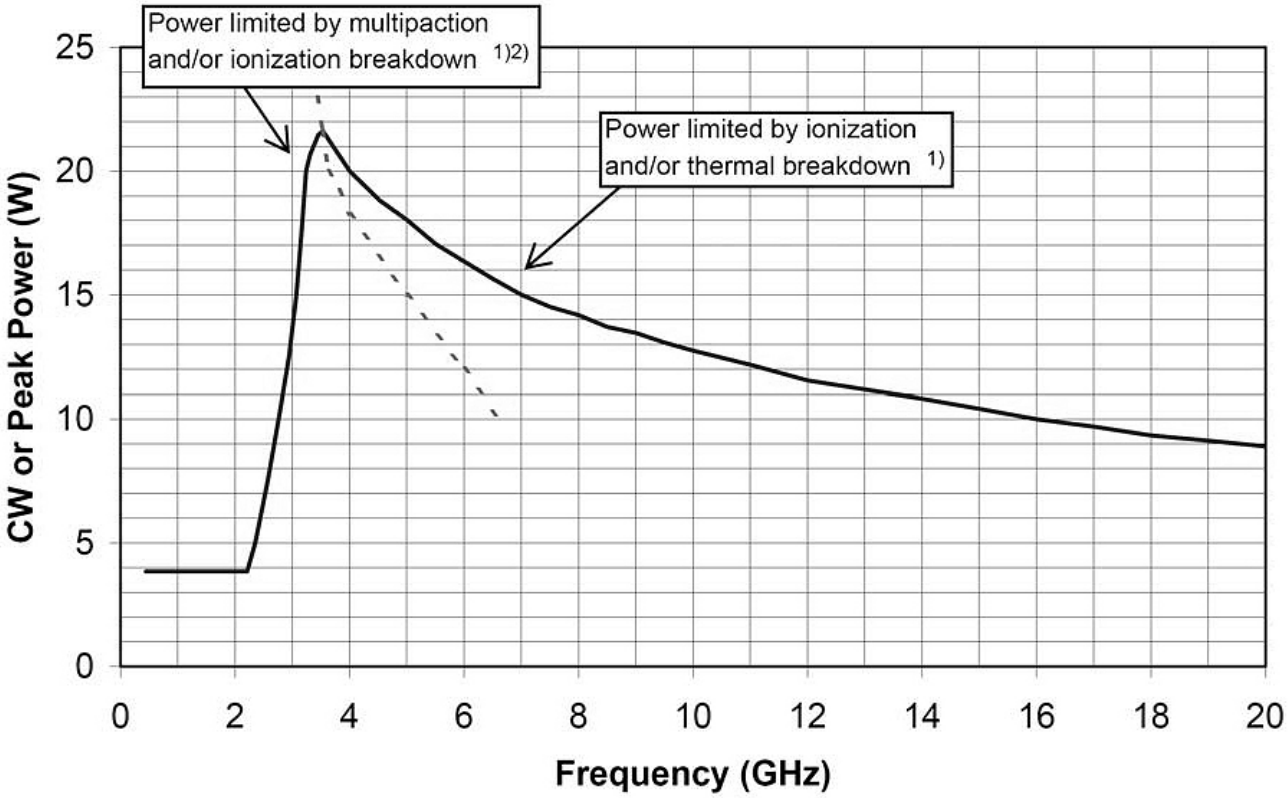
The maximum ratings shall not be exceeded at any time during use or storage.

Maximum ratings shall only be exceeded during testing to the extent specified in this specification and when stipulated in Test Methods and Procedures of the ESCC Generic Specification.

Characteristics	Symbol	Maximum Ratings	Unit	Remarks
Power	P	21.5	W	Note 1
DC Power	P_{DC}		W	
Variants 01 to 12:		1000		T_{amb} ≤ +25°C (Note 2)
Variant 13:		500		T_{amb} ≤ +70°C (Note 3)
Nominal Impedance	Z	50	Ω	-
Operating Frequency Range	f	See Para. 3	GHz	-
Operating Voltage	V_{op}	335	Vrms	-
Operating Temperature Range	T_{op}		°C	T_{amb}
Variants 01 to 12:		-65 to +155		
Variant 13:		-65 to +165		
Storage Temperature Range	T_{stg}		°C	-
Variants 01 to 12:		-65 to +155		
Variant 13:		-65 to +165		

NOTES:

1. Maximum Power (CW or peak) varies with frequency and it is limited by multipaction, ionization breakdown and thermal breakdown as shown below. The maximum operating frequency is given in Para. 3:

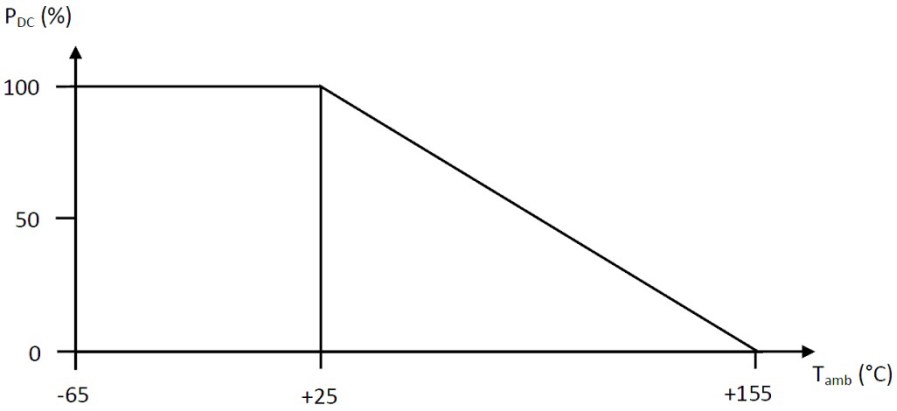


Maximum Power Handling in Space Vacuum at +25°C

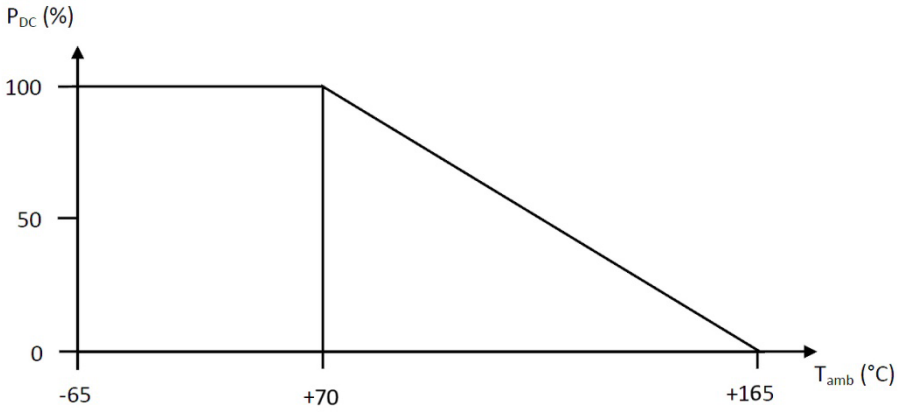
a) Load VSWR is better than 1.30:1.

b) The part of the curve limited by multipaction takes into account a 6dB margin as recommended by ESA.

2. For Variants 01 to 12, derate DC Power with respect to Operating Temperature as follows:



3. For Variant 13, derate DC Power with respect to Operating Temperature as follows:



1.6 PHYSICAL DIMENSIONS (SEE ALSO PARA. 3)

1.6.1 Connector Interface Dimensions

(a) SMP Female Connector Interface (Variants 01 to 12): compatible with series SMP socket contact interface (uncabled connector and cabled connector) as specified in MIL-STD-348.

(b) SMP Male Connector Interface, Limited Detent (Variant 13): compatible with series SMP pin contact limited detent interface as specified in MIL-STD-348.

(c) SMP Male Gauge Interface: compatible with series SMP pin contact interface (full detent, limited detent, smooth bore, catchers mit) as specified in MIL-STD-348

(d) SMP Female Gauge Interface: compatible with series SMP socket contact interface (uncabled connector and cabled connector) as specified in MIL-STD-348

1.7 MATERIALS AND FINISHES

Materials and finishes shall be as follows:

(a) For Variants 01 to 12:

- Shell: beryllium copper, with copper underplate 1.5µm minimum, electroless nickel underplate 2µm minimum, and gold plating 1.27µm minimum.
- Centre Contact: beryllium copper, with copper underplate 1.5µm minimum, electroless nickel underplate 2µm minimum, and gold plating 1.27µm minimum.
- Insulator: PTFE, PEEK or LCP.

(b) For Variant 13, the shell shall be made of passivated amagnetic stainless steel.

2 REQUIREMENTS

2.1 GENERAL

The complete requirements for procurement of the components specified herein are as stated in this specification and the ESCC Generic Specification. Permitted deviations from the Generic Specification, applicable to this specification only, are listed below.

Permitted deviations from the Generic Specification and this Detail Specification, formally agreed with specific Manufacturers on the basis that the alternative requirements are equivalent to the ESCC requirement and do not affect the component's reliability, are listed in the appendices attached to this specification.

2.1.1 Deviations from the Generic Specification

2.1.1.1 Deviations from Production Control – Chart F2

(a) Contact Engagement and Separation Forces: Not applicable to Variant 13.

2.1.1.2 Deviations from Screening Tests – Chart F3

(a) Coupling Proof Torque: Not applicable.

2.1.1.3 Deviations from Qualification and Periodic Tests – Chart F4

(a) Coupling Proof Torque: Not applicable.

2.2 MARKING

The marking shall be in accordance with the requirements of ESCC Basic Specification No. 21700 and as follows.

The information to be marked on the component or the primary package shall be:

(a) The ESCC qualified components symbol (for ESCC qualified components only).
(b) The ESCC Component Number (see Para. 1.4.1).
(c) Traceability information.

2.3 ENVIRONMENTAL AND MECHANICAL TESTS

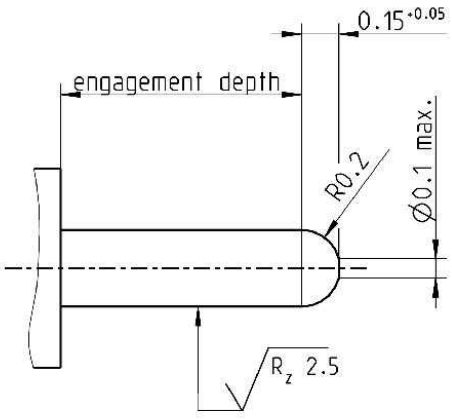
The following requirements apply to tests performed on the connector (and contact) lot as specified in the ESCC Generic Specification:

(a) Contact Engagement and Separation Forces (Variants 01 to 12 only):

	Maximum Diameter Test Pin (1) Test	Minimum Diameter Test Pin Test
Test Pin Diameter (mm) (2)	0.408 to 0.412	0.348 to 0.352
Engagement Depth (mm) (2)	1.2 to 1.3	1.2 to 1.3
Engagement Force (N)	6 maximum	-
Separation Force (N)	-	0.1 minimum

NOTES:

1. The Maximum Diameter Test Pin and the Oversize Test Pin are the same.
2. Test Pins details:



(b) Mating and Unmating Forces:

	Insertion Force (N)	Retention Force (N)
Smooth Bore or Catchers Mitt:	9 maximum	2.2 minimum
Limited Detent:	45 maximum	9 minimum
Full Detent:	68 maximum	22 minimum

(c) Centre Contact Retention: See Para. 3.

(d) Endurance: The number of mating and unmating cycles shall be as follows:

- During Qualification Testing:
  - For Variants 01 to 12 (all Female Variants; see Para. 1.4.2):
    - For mating with Full Detent counterparts (see Para. 1.6.1): 40 cycles
    - For mating with Limited Detent counterparts (see Para. 1.6.1): 100 cycles
    - For mating with Smooth Bore and Catchers Mitt counterparts (see Para. 1.6.1): 200 cycles
  - For Variant 13 (Limited Detent Male Variant; see Para. 1.4.2): 100 cycles
- During Periodic Testing:
  - For Variants 01 to 12 (all Female Variants; see Para. 1.4.2):
    - For mating with Full Detent counterparts (see Para. 1.6.1): 20 cycles
    - For mating with Limited Detent counterparts (see Para. 1.6.1): 50 cycles
    - For mating with Smooth Bore and Catchers Mitt counterparts (see Para. 1.6.1): 100 cycles
  - For Variant 13 (Limited Detent Male Variant; see Para. 1.4.2): 50 cycles

2.4 ROOM TEMPERATURE ELECTRICAL MEASUREMENTS (NOTE 1)

The measurements shall be performed at T_{amb} = +22 ±3°C.

Characteristics	Symbols	Test Method and Conditions	Limits		Units
			Min	Max	
Insulation Resistance	R_I	ESCC No. 3402	5	-	GΩ
Voltage Proof Leakage Current (Voltage Proof)	I_L	ESCC No. 3402 See Para. 3 Note 2	-	2	mA

NOTES:

1. Not required for Variant 13.
2. Between centre contact and shell.

2.5 INTERMEDIATE AND END-POINT ELECTRICAL MEASUREMENTS (NOTE 1)

Unless otherwise specified, the measurements shall be performed at T_{amb} = +22 ±3°C.

Unless otherwise specified, the test methods and test conditions shall be as per the corresponding test defined in Para. 2.3(d) Room Temperature Electrical Measurements.

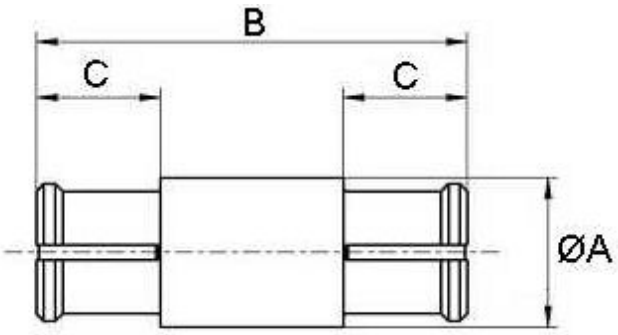
Test Reference per ESCC No. 3402	Characteristics and Test Conditions Ref. ESCC No. 3402	Symbols	Limits		Units
			Min	Max	
Random Vibration	Contact Resistance: I_T = 10mA, V_T = 6V				
	Centre contact:	R_{ctc}	-	6	mΩ
Mechanical Shock	Contact Resistance: I_T = 10mA, V_T = 6V				
	Centre contact:	R_{ctc}	-	6	mΩ
Temperature Cycling	Contact Resistance: I_T = 10mA, V_T = 6V				
	Centre contact:	R_{ctc}	-	6	mΩ
	Voltage Proof Leakage Current:	I_L	Note 2		
Electrical Measurements at Room Temperature	Insulation Resistance:	R_I	Note 2		
	Voltage Proof Leakage Current:	I_L	Note 2		
	Contact Resistance: I_T = 10mA, V_T = 6V				
	Centre contact:	R_{ctc}	-	6	mΩ
	Shell (Variants 01 to 12):	R_{cts}	-	2	mΩ
	VSWR (Note 3):	VSWR	Note 4		
	Insertion Loss:	LI	Note 4		
Endurance	Contact Resistance: I_T = 10mA, V_T = 6V				
	Centre contact:	R_{ctc}	-	6	mΩ
	Shell:	R_{cts}	-	2	mΩ

NOTES:

1. Not required for Variant 13.
2. As specified in Para. 2.3(d).
3. Measured with suitable low level RF power applied.
4. As specified in Para. 3.

3 COMPONENT TYPE VARIANTS – DETAIL REQUIREMENTS

3.1 VARIANTS 01 TO 12 – SMP IN-SERIES ADAPTOR, FEMALE-TO-FEMALE

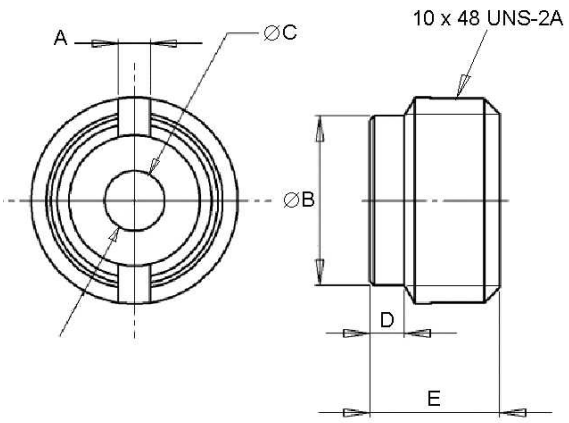


Symbols	Dimensions mm		Remarks
	Min	Max	
ØA	3.33	3.43	
B	6.44	6.47	Variant 01
	6.99	7.02	Variant 02
	8.19	8.22	Variant 03
	8.59	8.62	Variant 04
	9.89	9.92	Variant 05
	11.39	11.42	Variant 06
	12.58	12.61	Variant 07
	16.73	16.76	Variant 08
	19.49	19.52	Variant 09
	22.38	22.41	Variant 10
	23.79	23.82	Variant 11
	24.18	24.21	Variant 12
C	2.75	2.95	Variants 01 to 06
	2.9	3.1	Variants 07 to 12

ELECTRICAL CHARACTERISTICS	VALUES	UNITS
Frequency range	Variants 01 to 06: DC to 40 Variants 07 to 12: DC to 26.5	GHz
Maximum voltage standing wave ratio (VSWR)	Return Loss: Variant 01: DC to 6GHz: ≥ 30 6 to 12GHz: ≥ 23 12 to 18GHz: ≥ 15 18 to 40GHz: ≥ 12 Variant 02: DC to 6GHz: ≥ 30 6 to 12GHz: ≥ 23 12 to 26GHz: ≥ 15 26 to 40GHz: ≥ 10 Variants 03 to 06: DC to 6GHz: ≥ 30 6 to 12GHz: ≥ 20 12 to 26GHz: ≥ 15 26 to 40GHz: ≥ 13 Variants 07 to 12: DC to 4GHz: ≥ 30 4 to 18GHz: ≥ 20 18 to 26.5GHz: ≥ 15	dB
Maximum insertion loss	$0.05\sqrt{f(GHz)}$	dB
Voltage proof	500	Vrms

MECHANICAL CHARACTERISTICS	VALUES	UNITS
Minimum centre contact retention force (axial)	7	N
Minimum centre contact retention torque	Not applicable	
Maximum weight	Variant 01: 0.17 Variant 02: 0.2 Variant 03: 0.23 Variant 04: 0.3 Variant 05: 0.4 Variant 06: 0.43 Variant 07: 0.5 Variant 08: 0.63 Variant 09: 0.8 Variant 10: 0.9 Variant 11: 0.95 Variant 12: 1	g

3.2 VARIANT 13 – SMP BULKHEAD MALE RECEPTACLE WITHOUT CENTRE CONTACT, LIMITED DETENT



Symbols	Dimensions mm	
	Min	Max
A	0.7	0.8
ØB	3.9	4
ØC	1.43	1.47
D	0.75	-
E	2.97	3.07

ELECTRICAL CHARACTERISTICS	VALUES	UNITS
Frequency range	Not applicable	
Maximum voltage standing wave ratio (VSWR)	Not applicable	
Maximum insertion loss	Not applicable	
Voltage proof	Not applicable	

MECHANICAL CHARACTERISTICS	VALUES	UNITS
Minimum centre contact retention force (axial)	Not applicable	
Minimum centre contact retention torque	Not applicable	
Maximum weight	0.2	g

APPENDIX A

AGREED DEVIATIONS FOR ROSENBERGER (D)

ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS
Para. 1.4.1, The ESCC Component Number	The ESCC Component Number may include the additional Manufacturer's code 'B' as indicated in the following example: Example: 340202601**B**